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## PROBLEMS IN THE TREATMENT OF BURNS

### Liver Necrosis as a Lethal Factor

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**I**N a recent paper<sup>1</sup>, one of us called attention to the fact that there has been no reduction in the mortality rate for burns in this country during the past five years. A report from the Charity Hospital in New Orleans<sup>2</sup> states that from 1932 through 1936, there were 209 deaths in 1,154 cases, a mortality of 18.1 per cent. There was a mortality of 12.1 per cent in 272 patients treated with tannic acid at the Cook County Hospital<sup>3</sup>. In 1935, a report from the Henry Ford Hospital<sup>4</sup> showed 42 deaths in 358 patients or 11.7 per cent. We recently brought these statistics up to date, and found that we had had 22 deaths in 125 cases of acute burns which were hospitalized, a mortality of 17.6 per cent. The fact that many of the cases in the later series were hopelessly burned industrial cases does not relieve us of the feeling that the death rate from burns is still too high.

We have been greatly interested in the treatment of burns since the late E. C. Davidson originated the tannic acid treatment when he was resident surgeon of the Henry Ford Hospital. His first paper appeared in 1925<sup>5</sup> and it was the stimulus for a great wave of interest in the treatment of burns. The use of eschar-forming chemicals was a convenient method of treating the skin; it eliminated dressings and greatly increased the comfort of the patient. However, in a recent article in the Journal of the American Medical Association,

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Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

Trusler and his associates<sup>6</sup> question the value of tanning methods of treatment, and report a case treated with saline compresses. Recovery in their case was attributed to the administration of 6 transfusions during the first four days, and the avoidance of excessive forcing of fluids, especially water by mouth and rectum. In two recent papers<sup>1,7</sup>, one of us emphasized that disagreements regarding various methods of local treatment should not distract the attention from the more important problems of general treatment, i.e. "the treatment of a very sick patient who has a threatening toxemia, alterations in the blood chemistry, a wound very susceptible to infection, and pathologic changes in organs remote from the skin."

The great problem in burns is the cause and treatment of the symptoms which appear on the second and third days. This phase is commonly referred to as the "toxemic phase" or secondary shock phase. The picture is easily recognized by one who has observed a number of burn cases. The patient may have a comparatively small area burned, for example 25 per cent. The clinical course during the first day or two has been good. Rather suddenly, the urinary output diminishes. The patient who has been mentally alert becomes confused. There may be vomiting, and the vomitus may contain blood. Icterus may appear. The blood pressure drops; it may be elevated by treatment, but is maintained with difficulty, and finally there is circulatory failure. The patient becomes comatose, and dies shortly.

The cause of this "toxic" phase has not been settled. Davidson believed with others that a toxin was formed in the burned skin, which was carried in the circulation to other parts of the body. He hoped that the coagulation of the burned proteins on the surface by tannic acid would reduce the toxemia. Although it is readily admitted that this was a futile hope, it is by no means improbable that some sort of a toxin does exist. The most important piece of evidence is the frequency of the occurrence of hepatitis. There were five autopsies in our recent series of 22 deaths. Four of these showed liver necrosis of a degree thought to be incompatible with life. An example of this type of liver damage is shown in the photomicrograph reproduced in fig. 1.

In 1898, Bardeen<sup>8</sup> published a report of the pathologic changes in the organs of five patients who died of burns. The longest period of survival was 9½ hours, but even with these acute burns, certain changes in the liver were noted. He stated "The liver showed parenchymatous swelling of the epithelium, with focal areas in which there was marked vacuolization of the cell nucleus and some although slight nuclear fragmentation. No hyaline degeneration was seen. Capillary thrombosis was, however, not very infrequent, and

in several places karyokinesis was discerned in the capillary endothelium."

Wilson and his associates<sup>9</sup> in Edinburgh studied autopsy material from 20 burn cases, and concluded that there was a lesion in the liver which was almost characteristic for burns. A recent report from London<sup>10</sup> calls attention to the fact that the liver necrosis in burns simulates the condition found in yellow fever. Many of our non-fatal cases have shown evidence of toxic hepatitis, with the appearance of jaundice to a marked degree, and decreased liver function. The icterus index has been as high as 130 units with recovery. Further evidence for the toxic theory will be mentioned only by reference to the literature<sup>11,12</sup>.

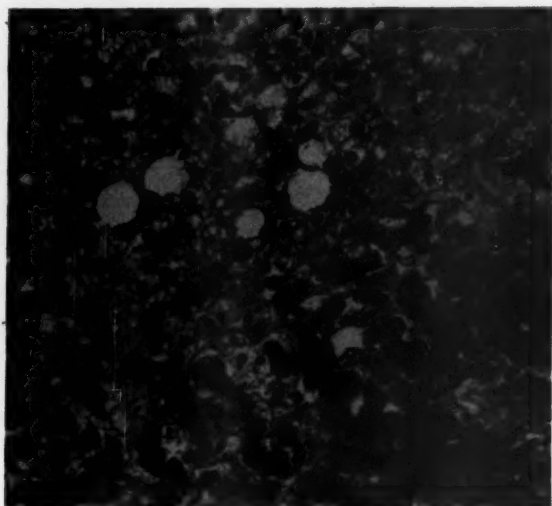


Fig. 1. Photomicrograph of liver tissue removed from patient who died on third day. Fifty per cent of body surface was burned. All of the liver cells except those in the lower right hand corner show marked degeneration.

A popular theory with several investigators has been the physical theory, which assumes that the condition of shock on the second and third days is due to "white bleeding" or leakage of plasma onto the surface of the burned areas and into the tissues in the region of the burn. This theory has been favored by Underhill<sup>13</sup>, Blalock<sup>14</sup> and Harkins<sup>15</sup>. Loss of plasma results in an increase in the hemoglobin and hematocrit readings. If the lost plasma is replaced by saline solution, the hemoglobin may be normal, but there is a decrease in the plasma protein concentration, sometimes to a very marked degree. Tables 1 and 2 show the plasma protein values in eight of our

cases, four of which survived and four died. It is noted that there is always a decreased protein concentration, from the normal of 7 Gm. to 4 or 5 Gm. The lowest figure was 3.71 in a fatal case. (The liver tissue shown in fig. 1 is from this case). An analysis of the other figures shows that there is no correlation between the extent of the burn and the level of the plasma proteins, and furthermore, the plasma protein level was not a good index of prognosis, since one case with proteins as low as 4 Gm. recovered without showing shock or edema, while others with higher levels succumbed.

TABLE 1  
*Survivals*

Case No.	% Burned	Day of Burn	Albumin	Globulin	Total Proteins
301988	25%	1	4.62	2.23	6.85
"		3	2.90	1.61	4.50
"		7	1.92	2.08	4.00
"		11	2.01	2.02	4.03
198577	25%	2	4.62	2.60	7.25
"		4	4.22	2.06	6.28
"		6	3.62	2.10	5.72
83741	45%	9	3.41	1.21	4.62
"		12	4.37	2.32	6.69
291034	33 $\frac{1}{3}$ %	4	2.22	2.41	4.63
"		6	2.99	2.40	5.39
"		7	3.42	2.67	6.09

TABLE 2  
*Fatal Cases*

Case No.	% Burned	Day of Burn	Albumin	Globulin	Total Proteins
301991	20%	1	5.21	2.04	7.25
"		2	3.43	2.85	6.28
"		3	2.41	2.70	5.11
"		4	2.17	1.99	4.16
291361	60%	2	3.34	2.14	5.48
"		3	3.44	2.43	5.87
260083	20%	5	2.48	2.68	5.16
258627	50%	2	2.81	0.90	3.71

The third theory to explain the toxic phase is the bacterial theory of Aldrich<sup>10</sup> who believes that all of the symptoms are due to infection with streptococci in the wound. He cultured this organism from the skin in severe cases, and invariably found it in the blood of fatal cases. His work has not been substantiated. Infection plays its role in the later phase, the so-called phase of sepsis.

The above brief discussion of the burn problem serves as a background for the outline of rational therapy which follows.



When the patient arrives in the emergency room, he is examined to determine if primary shock is present, and if he is suffering from pain. Primary shock is observed rather rarely. It was not seen in any of the patients in our recent series who survived. If present, it should be treated in the usual manner, namely, by raising the foot of the bed or stretcher, applying external heat, administering stimulant drugs, and intravenous fluids or transfusion. Morphine or codeine should be given in generous doses. When the patient arrives in his room, a "burn bed" should have been prepared with sterile sheets. The room should be warm. Any clothing remaining is then cut away or first aid dressings removed, and the patient transferred to the sterile bed.

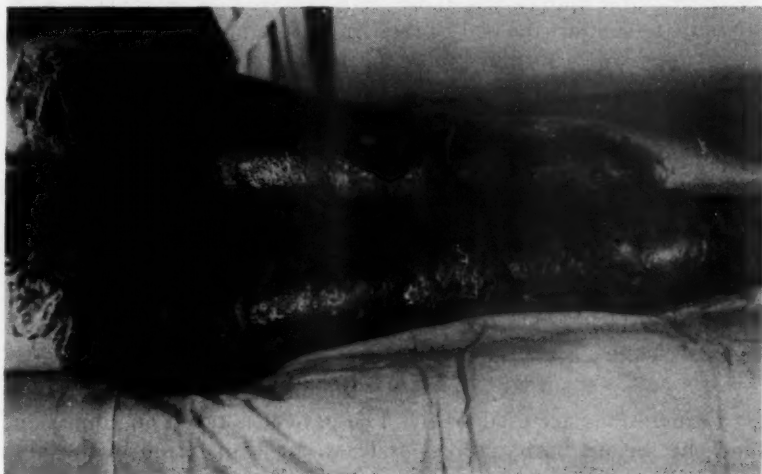


Fig. 2. Severe burn of the thighs, legs and buttocks as a result of a gasoline fire. Eschar resulting after tannic acid jelly applied 18 hours before.

At this stage, every precaution should be taken to treat the burn as a large open surgical wound<sup>17</sup>. Attendants in the room should wear masks, and those actually handling the patient and carrying out the local treatment of the burned skin should wear gloves, gowns and masks. Debridement of the wound is then begun. We do not advocate the use of a general anesthetic for this purpose. In our present series of 125 cases, an anesthetic was used only once. Dirt and grease may be removed with the proper solvents, green soap and water, saline solution, benzene or ether. All blisters are opened and the loose pieces of epidermis are cut away, using sterile forceps and scissors. This will not be painful to the patient who has had adequate sedation.

When the debridement is finished, the burned area is immediately covered with a layer of tannic acid jelly. We have used such a jelly as a vehicle for tannic acid for the past five years. One hundred and nine of the 125 cases were thus treated. The jelly consists of a tragacanth base, to which is added tannic acid to the strength of 7.5 per cent, and an antiseptic, hexyl-dichloro-resorcinol<sup>18</sup>, with a concentration of 1:2000. The jelly can be prepared in advance, since the antiseptic prevents the bacterial action on the tannic acid. The aqueous solution, on the contrary, must be freshly prepared.

Several applications of the jelly over a twelve-hour period will result in the formation of a satisfactory eschar (fig. 2). If other blisters appear, they are opened and the new areas treated as usual. After the first application of the jelly, the patient is covered with a cradle to support the bed clothes. Heat is supplied by several bedside lamps which protrude into the tent.

General care consists of combating dehydration and plasma deficit, and non-specific supportive measures during the crucial second, third and fourth days. Fluids may be taken by mouth if tolerated, but vomiting is common. On the other hand, too much water may be drunk, and a situation similar to heat exhaustion due to "water intoxication" may occur, as pointed out by Trusler and his associates<sup>6</sup>. It is more reliable to give most of the fluid by the intravenous route in the early days of a severe burn. We usually give equal quantities of physiologic saline and 10 per cent glucose. The former supplies chloride and the latter supplies carbohydrate to combat ketosis and is theoretically good for the liver which is threatened.

Transfusions are used freely. The patient is typed on admission, and the serious burn receives at least one transfusion in the first twelve hours. If the hemoglobin is high, the cells are removed and the plasma is given. Cells are usually removed by centrifuging, but in hospitals where there is a blood bank, a simpler method is available. As suggested by Lehman<sup>19</sup>, the supernatant plasma may be pipetted off after the cells have settled out.

The indications for blood and plasma transfusions are not well defined at the present time. Probably all burns which are potentially serious, i.e. those involving more than 20 per cent of the body surface, should receive a daily transfusion for the first few days. We have given as many as five transfusions a day, each transfusion consisting of 600 cc. of citrated blood or 350 cc. of plasma. Definite indications for transfusion are a low plasma protein level and a falling blood pressure.

As a rule, we leave the following orders on the serious burn case for the first five days:

**Special nurses**

Blood pressure every two hours

Temperature, pulse and respiration every two hours

Hemoglobin every four hours

Intake and output chart: Specific gravity of each urine specimen

Daily blood chemistry: Serum proteins, chlorides, non-protein nitrogen, carbon dioxide combining power, and icterus index

Daily leukocyte count

Daily urine for albumin, acetone, and microscopic elements



Fig. 3. Removing a "calibrated graft" with the dermatome to apply to the granulating area on the left leg. Recipient area may be seen on the extreme right.

Recently, we have been making an intensive study of burns, and in addition to the above, we have made the following observations: Blood cultures, cultures of burned areas before and after the formation of the eschar, blood sodium and potassium, and oxygen saturation of arterial blood.

#### AFTER CARE

The subsequent treatment presents no difficult problem. The eschar begins to loosen, and in two or three weeks, depending on the depth of the burn, it falls off or is cut away, leaving healed skin or granulating surfaces beneath. Infection may occur under the eschar. It was noted in 17 per cent of our cases. Infection is recognized by temperature elevation, and softening of the eschar. The eschar should be removed immediately in such a case. The infection

is usually easily controlled with boric compresses or by painting with gentian violet.

Skin grafting should be employed early, if granulating surfaces remain after the removal of the eschar. Small areas may be grafted with Reverdin or pinch grafts even if there is some infection present. The most satisfactory graft is the intermediate graft, and at the present time, we are cutting these grafts with a dermatome, which is a slight modification of the machine described by Padgett<sup>20</sup> (fig. 3).

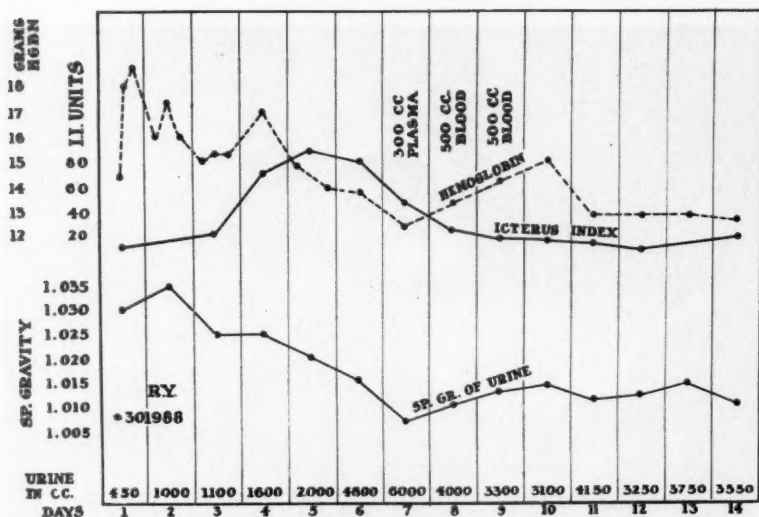


Fig. 4. Chart showing behavior of hemoglobin, icterus index, and urinary output during first two weeks of burn.

Other eschar-forming agents have been used on the skin with success. Bettman<sup>21</sup> suggested the applications of 10 per cent silver nitrate after the first application of tannic acid solution. This results in the formation of a thin eschar very rapidly, and no further applications are necessary. Gentian violet combines with the exudation from the burn to form a fairly satisfactory crust.

The following case report is given in detail, because it illustrated most of the complications which occur in the management of burns.

R. Y. was a white man, aged 42. He was transferring gasoline from a truck to a tractor, with both engines off, when the gasoline suddenly ignited. His trousers caught fire. He could not put the fire out by rolling, and at the suggestion of a fellow worker, he ran 100 yards to a lake. He was admitted to the Henry Ford Hospital two hours later, on Nov. 11, 1939.

He had an extensive burn involving the posterior aspect of both thighs, almost the entire circumference of both legs, and both buttocks. There were super-

ficial burns about the hands. The area was estimated to be 20-25 per cent. He was not in shock, and local treatment was begun at once. After debridement, tannic acid jelly was applied and in 18 hours, a satisfactory eschar had been obtained (fig. 2).

Figure 4 shows the character of the urinary output during the first two weeks, the hemoglobin level and the icterus index. In spite of the fact that he was taking fluids by mouth, very little urine was excreted the first day. On the second day, vomiting occurred, and he was given 5000 c.c. of fluids parenterally. By the fourth day, the output of urine had reached 1600 c.c. and the specific gravity was falling from its previously high figure. The hemoglobin reached a height of 18.5 Gm. on the evening of the first day, and was as high as 17 Gm. on the fourth day.

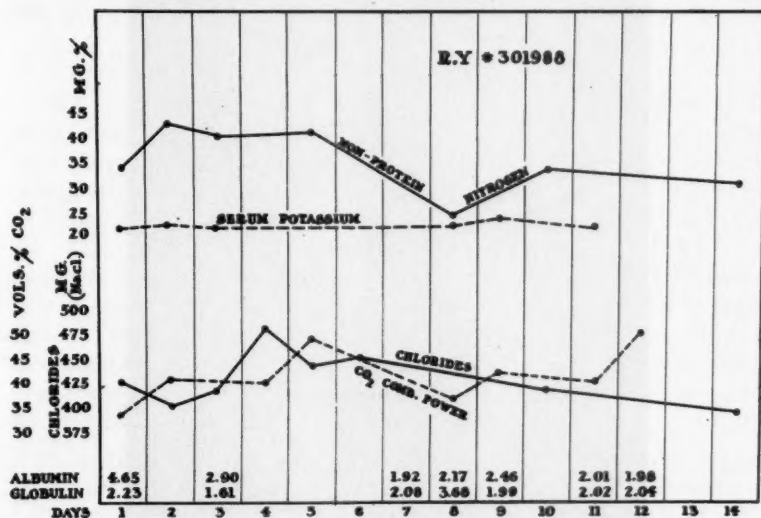


Fig. 5. Chart showing blood chemical changes during first two weeks of burn.

The icterus index was 12 on admission. On the third day, it was 20, and on the fourth, 71. Coincident with this, it could be seen that the patient was in a mild toxic state. He was drowsy and irritable and could retain nothing on his stomach. It was felt that he had toxic hepatitis as a result of the burn. He was given large quantities of glucose intravenously to aid in the regeneration of the liver. The icterus index was down to 11 on the eleventh day. Two types of liver function tests were done. The galactose tolerance test on the eighth day showed a urinary excretion of 8.75 Gm. indicating an impaired capacity of the liver to convert galactose (above 5 Gm. excretion abnormal). The intravenous hippuric acid test showed an excretion of .82 mg. in 2 hours. This is above the lower limit of normal (0.7 mg.) but on the fourteenth day, the excretion was 1.12 mg., indicating an increase in liver function. The prothrombin level on the eighth day was 35 per cent; 12 days later it was 90 per cent.

The level of blood chloride was determined frequently, and it never fell below 400 mg. (whole blood, chloride expressed as NaCl). The carbon dioxide

combining power was as low as 33.7 volumes per cent, indicating a mild acidosis. The non-protein nitrogen reached a maximum of 42.8 on the second day. The serum potassium did not rise above the upper limit of normal (fig. 5).



Fig. 6. Condition of patient at time of discharge.

The behavior of the plasma proteins is interesting (fig. 5). On admission, there was a normal picture, with 4.65 per cent albumin and 2.23 per cent globulin. At the end of a week, the albumin-globulin ratio was reversed. It is noteworthy that this loss of protein was almost all at the expense of the albumin. The patient was given 300 c.c. of plasma and 500 c.c. of blood on the two succeeding days. Two months later, the albumin was 3.84, the globulin 2.10. It should be noted that although the total proteins were about 4 Gm. for a considerable period, the patient did not show edema.

The blood count was 30,000 on the second day, and remained at 15,000 for several weeks.

During the second week, the patient began to have temperature elevations daily. He felt "chilly" on several occasions. It was evident that there was some infection under the eschar near the perineum. The crust was removed, leaving that on the rest of the legs intact. The infected areas were treated with



gentian violet, and healed rapidly. Blood cultures were negative. Cultures of the purulent material yielded a mixed growth of organisms.

By the end of the fourth week, the crust was off, leaving areas of granulation tissue on both calves. An intermediate graft was applied to the larger granulating area on the left leg (fig. 3). At the time of discharge on Jan. 25, 1940, only a few small crusted areas remained (fig. 6).

In this report, we have shown most of the complications of a non-fatal burn, namely, blood concentration, oliguria, toxic hepatitis with jaundice, plasma protein deficiency, and infection. Each of these complications were treated appropriately when the occasion demanded. It is readily seen that the application of the tannic acid in the early hours was a minor part of the treatment.

#### SUMMARY

We have presented our conception of the burn problem as it exists today. We have emphasized again that the treatment of the skin alone cannot be expected to save lives, and if the borderline group of cases is to be saved, those treating such cases will need to make use of every therapeutic weapon that has promise of being of value. We have stressed the apparent importance of the liver lesion in severe burns. Toxic hepatitis is easily recognized clinically in cases that survive, and massive liver necrosis is observed in fatal cases. The burn problem still presents a challenge to the clinician and the laboratory worker and all physicians should bear in mind that most burns are preventable and the number might be reduced by more safety propaganda.

Note: The dermatome used to cut the intermediate skin graft illustrated in this paper furnished us through the courtesy of Prof. Geo. J. Hood, of Lawrence, Kansas.

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## IMPORTANCE OF EARLY DIAGNOSIS OF UROLOGIC AFFECTIONS

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**E**ARLY and correct diagnoses are more important for patients with urologic disorders than remedies to relieve pain, pyuria and hematuria.

To discuss such a truism would seem to be a waste of time were it not that, obvious as it seems, patients are constantly being treated for dysuria, pus in the urine and blood in the urine for long periods without a reasonable search for the cause of these evidences of disease.

As far back as the time of Hippocrates and Celsus the method of logical deduction was recognized to be of value in arriving at correct diagnosis of urinary retention, calculi in the urinary tract and other urologic affections.

Much later urinalysis was used as an index of urinary diseases. Alert medical quacks soon took up this method and began to *guess* at the prognosis from a mere glance at the urine.

Proper diagnosis finally came only when a search for the *source* and *cause* of abnormal urinary findings was made possible by the assistance of cystoscopic procedures and x-ray studies. These diagnostic aids came into use about the time automobiles began to chug along our highways, that is about thirty or forty years ago. Today modern urologic diagnostic methods are proportionately as much better than the early ones as is the 1940 Ford better than the original Model T. Yet, unfortunately, the use of improvements in the manufacture of motor cars has far outrun the general utilization of modern methods in the diagnosis of urinary disorders. Many who now ride in cars of the latest model still hopefully guess at urologic diagnoses and treat symptoms, without knowing their causes, until minor maladies have become major ones.

If we had scales which could weigh the *good* against the *harm* caused by these "soothing syrup agencies" applied by the doctor who uses Model T methods of diagnosis, we would have little in such comparisons of which to be proud.

Penalties follow delay in diagnosis.

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Read before the Postgraduate Surgical Assembly (the eleventh annual meeting) of The Southeastern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

1. Benign tumors of the bladder become malignant.
2. Small calculi become so large that they require major operations for their removal.
3. Ureteral obstructions cause so much hydronephrosis and pyelonephritis that the kidney is merely a useless shell instead of a useful excretory organ.
4. Prostatic obstructions are allowed to persist until the patient is "old for his age" and perhaps a poor subject for relief by even a mild measure designed for the removal of the obstructing tissue.
5. Cancers of the prostate and kidney metastasize before their removal.
6. Renal tuberculosis becomes bilateral and complicated by a hopeless cystitis.

Other examples of such penalties because of delay in diagnosis could be cited but they seem unnecessary.

How are such delays in diagnosis to be prevented?

*First*, one may say that we must *unlearn* some of the things we believe in; for example, we must *learn* that a *negative test for albumin in the urine is not always* reliable in excluding kidney disease and other urinary disorders.

*Second*, We must remember that *pain* is not always present even in serious urologic diseases.

*Third*, We need to be impressed with the fact that *pyuria* and *hematuria* are symptoms requiring a search for their source and cause.

Pyelitis and cystitis, chronic or recurring, are not diseases; they are usually symptoms of obstructive lesions. Chronic non-specific urethritis is not a disease; it is usually a symptom of a urethral stricture or a small meatus.

Chronic prostatitis is often caused by poorly draining ducts from glandular acini.

A common cause of chronic seminal vesiculitis is obstructions to the ejaculatory ducts or improper sexual habits.

Is not this list sufficient to show the need of diagnosis to ascertain the cause of *symptoms* instead of to treat them with palliative measures?

The apparent successes with the "soothing syrup remedies" often are worse than their failures.

Proof of the high cost of delay in urologic diagnosis would be easy to find if by the magic of television we could look today into all the operating rooms in all of the hospitals in America. Would we not see a multitude of major operations done for advanced lesions which could have been cured better by minor procedures if they had only been recognized early?

The sad part of these urologic tragedies is that in a great majority there are *clear cut warning symptoms* which should lead to correct diagnoses.

## ORDERLY STUDY

Orderly study in urologic diagnosis is of vital importance. Nothing should be taken for granted, snap shot diagnoses should not be made. Guessing should be left to your competitors. Good light and good exposure should be first assistants in the physical examinations. Leads should be followed as they are evolved by the history, inspection, physical examination, study of smears, watching the patient void, urinalysis, palpation of the prostate and seminal vesicles, and microscopic study of secretion expressed.

Is it not like hunting game? Considerable thought is given concerning the best place to go; suitable means are employed to get there; and appropriate measures are used to locate the game. Finally, the game must be seen and carefully aimed at if it is to be bagged and carried home. How successful would a hunting trip be if shots were fired without first seeing the game and taking accurate aim?

Is not guessing at the cause of *pus* or *blood* in the urine about as stupid as it would be to shoot at woods or fields hoping by chance to make a lucky hit? Should not an adequate diagnosis serve its major purpose as a guide to wise treatments?

## FUNCTIONAL TESTS

Tests of renal function are of great importance. Many are made with dyes to determine, by their rate of excretion, the functional capacity of the kidneys.

*More than renal function*, however, may be obtained from the voided output of such dyes. For instance, phenolsulphonephthalein, if given intravenously, not only provides a good test of kidney function but also affords valuable information as to the presence of residual urine. To obtain this information it is necessary to modify the test as originally employed and to collect the specimen of urine at fifteen minute intervals, instead of one and two hours after its administration.

The normal individual will pass 25 to 30 per cent or more of the dye in the first 15 minute specimen of urine. Thus it is shown that:

1. The renal function is within normal range.
2. There is little if any residual urine in the bladder or pelvis.
3. Blood urea, non-protein nitrogen and creatinin are within reasonable limits.
4. Further studies, if needed, with opaque media intravenously may be employed with reasonable safety.

All of these are things gained by this easy, safe and painless test. We know of no other which affords so much information when the

test is positive. If negative, however, the evidence is not so conclusive.

There are a few sources of error. For example, hepatic disease may increase the output of dye, as occasionally does high blood pressure. Or the dye, on rare occasions, is changed in chemical structure by the liver.

When the dye excreted is less than 25 per cent for the first 15 minutes further study becomes necessary to ascertain the reason for its low output.

The first thing to suspect is that it is retained as residual urine in the bladder. This surmise can be cleared at once by the introduction of a soft catheter. If this fails to account for the shortage of dye, it becomes evident that the kidneys or ureters are at fault.

What the next step in the diagnostic study should be depends upon the age and condition of the patient and upon the leads elicited by the history and physical examination.

While this test may or may not give sufficient information as to the source and cause of pus and blood in the urine, it does give *direction* to the study. It tends to permit the maximum gain from the minimum of investigation, instrumental, chemical or roentgenologic, and it lessens pain and expense involved in the procedures required.

#### CAUSATIVE LESIONS

Common affections should be eliminated first:

1. A small meatus is often the cause of a chronic or recurring non-specific urethritis.
2. The same thing is true of urethral strictures, even when the size and force of the stream seem adequate.
3. Chronic prostatitis often is kept up by an obstruction in the anterior urethra.
4. Chronic cystitis in boys and girls, men and women, young and old, usually is caused by obstruction in the urethra or at the vesical neck.
5. The same is true of bed wetting in children.
6. Irritation in the deep urethra, often relieved by urethral dilatation, is the most frequent cause of excessive masturbation in boys.
7. Pyelitis, chronic or recurrent, in both sexes, and in all ages, nearly always is due to obstruction in the ureter, at the vesical neck or in the urethra. It should be regarded, therefore, as a symptom, not as a disease entity.

#### OBSTRUCTIONS

Stagnant urine or stagnant secretion is an ever potent cause of chronic or recurrent infections. There are two main subdivisions of obstructions:



1. Obstruction to a *channel-way*, such as the urethra, vesical neck or the ureter.

2. Obstruction to the *outlet* of a cavity, such as a pocketed area in the urethra or prostate, a diverticulum of the bladder or even a calyx of the kidney drained by a narrow opening into the pelvis.

Poor drainage from a chronically inflamed seminal vesicle acts also in a similar manner.

In the diagnosis of urinary infection it is not enough to identify the infecting organism and administer suitable urinary antiseptics, it is necessary to ascertain the obstructing factor, which so often plays a primary part in retarding favorable results from therapeutic measures. The same is true when dealing with urinary calculi, a considerable percentage of which are caused by stasis and infection: To clear the urinary channels after the removal of calculi, so that both stasis and infection may be minimized, is often as important as is the removal of stones. No diagnosis of stones of the bladder or kidney should be regarded as complete until these factors have been ascertained along with identification of the infecting micro-organisms.

#### BLADDER AND KIDNEY DYSFUNCTION

Even though chronic or recurrent infection should be caused to disappear by appropriate urinary antiseptics alone, back pressure from obstructive lesions may so damage renal function that the victory is only a Pyrrhic one. Relieved of certain discomforting symptoms and with the urine clear of pus, the patient may enjoy a false sense of security until serious impairment of renal function has resulted. It should be remembered that large accumulations of residual urine in the bladder or in the hydronephrotic kidney may occur at times with few symptoms and no urinary findings to suggest their existence.

#### DIFFERENTIATION BETWEEN UROLOGIC, ABDOMINAL AND SPINAL CORD LESIONS

Differentiation between urologic, abdominal, neurogenic and spinal lesions, at times, taxes the diagnostic ability of the surgeon or urologist. The puzzling features, however, usually disappear when proper investigations are made.

Differential diagnosis between right ureteral obstruction and appendicitis often presents a difficult problem. A postoperative attack of pain in the right flank is disappointing to the patient and embarrassing to the surgeon. Pain in the right side should always give rise in the mind of the surgeon to the question of ureteral stone or obstruction. When in doubt urologic studies should be made, such

as x-rays, intravenous urograms or cystoscopic studies. Reproduction of the pain upon filling the kidney pelvis with normal saline is a diagnostic sign of ureteral obstruction.

The advent of pyelography and cholecystography have greatly simplified the differential diagnosis of lesions of the gallbladder and kidney. At times, however, the diagnosis is far from simple. When lesions of the gallbladder and kidney coexist it may become a problem of importance to decide which is more grave.

Acute pyelitis, cortical abscess of the kidney, and perirenal abscess, subdiaphragmatic abscess and liver abscess at times may be difficult to differentiate.

Cysts of the pancreas and other retroperitoneal tumors may be confused with tumor of the kidney or hydronephrosis until adequate urologic investigations have been made.

Gynecologic lesions may cause symptoms apparently of urinary origin and vice versa.

Interstitial cystitis or elusive ulcer of the bladder, with its clear urine and distressing symptoms, usually results in one and often several abdominal operations before a correct diagnosis is made.

#### SUMMARY

Early and correct diagnosis of urologic disorders is far more important than are remedies to relieve pain, pyuria and hematuria.

Because of delay minor lesions become major ones and good subjects for operative relief become poor ones.

A negative test for albumin in the urine is *not* reliable in excluding urinary diseases.

Apparent success from sedative drugs, hemostatics and urinary antiseptics often gives a false sense of security.

Damage from continued back pressure and aggravation of urologic lesions are high prices to pay for such "soothing syrup" delays and failure to make thorough urologic studies.

## DERMOID CYSTS COMPLICATING PREGNANCY

Report of a Case of Bilateral Dermoid Cysts with Torsion of One  
Complicating a Pregnancy Which Terminated Normally  
in Spite of Excision of Both Ovaries

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THE interesting factor of the case being presented is the unusual accumulation of a number of conditions which are common enough in themselves. Dermoid cysts are certainly not unusual, as they are generally conceded to comprise about 10 per cent of all ovarian cysts. Even bilateral dermoids are not infrequently seen, as 10 to 40 per cent of dermoid cysts are said to be bilateral.<sup>1,2,3</sup> Torsion of a cyst pedicle, while not a daily finding, is by no means rare, and pregnancy is certainly not uncommon. However, the occurrence of bilateral dermoid cysts with torsion of one in the presence of pregnancy constitutes an unusual combination of circumstances.

### REPORT OF CASE

About 3 p. m., Aug. 21, 1938, a 16 year old, unmarried girl reported to the Clinic complaining of pain in the left lower quadrant.

In March, five months before her first visit, she failed to menstruate. In April she menstruated six days, passing some clots. In May the menstrual period was normal. In June, July and August there was no menstruation. At about 8 a. m. August 21 she began to have paroxysms of knifelike pain in the left lower quadrant, lasting twenty minutes at a time. There were several attacks, the pain becoming more severe about noon and subsiding after the administration of  $\frac{1}{4}$  grain morphine at 1:30 p. m. There was no nausea or vomiting with this or any previous attack.

The patient reported coitus weekly or oftener since December, 1937, and denied any attempt at self-abortion. There had been no vaginal bleeding. A yellow vaginal discharge had been noticed since November, 1937.

The patient was a well developed, well nourished girl lying quietly on a stretcher with occasional grimaces of pain. The breasts were firm, rounded, symmetrical. There was no colostrum. Examination of the abdomen revealed a round, smooth, tense, movable mass in the right lower quadrant, about 9 by 6 by 6 cm., not particularly tender. There was a similar ovoid but somewhat irregular, firm, very tender mass in the left lower quadrant, the upper margin of which was at the level of the umbilicus. This mass was approximately the same size and consistency as that on the right. In addition, there was a rounded, soft, smooth mass palpable in the lower abdomen just above the pubis. The introitus was marital. The cervix was elongated and softened. The uterus was enlarged to about the size of a four months pregnancy. It was anteverted, anteflexed and movable independently of the two masses in the right and left lower quadrants.

The following impressions were noted on the chart following history and physical examination:

1. Pregnancy (uterine) three months.
2. Bilateral cysts of the ovary (dermoid ?) with torsion of the pedicle of the left cyst.

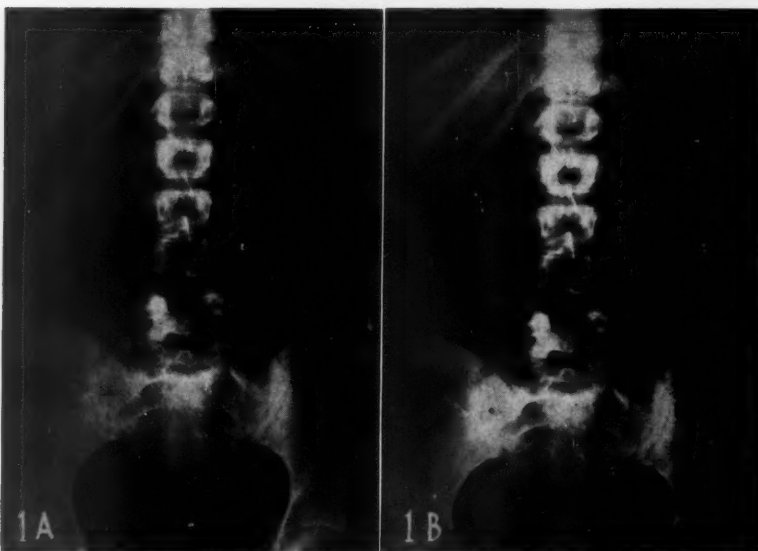


Fig. 1a. An unretouched print of the original flat plate taken on August 21, 1938 revealing the splotchy masses of radiopaque material at the respective levels and within the areas of the abdominal masses described in the text.

Fig. 1b. Identical with 1a except that the previously mentioned radiopaque areas have been outlined with wax pencil and arrows drawn pointing toward them.

In order to substantiate the tentative diagnosis of bilateral dermoids, two roentgenograms were made. The first was a flat plate which revealed splotchy masses of radiopaque material within the areas of the previously mentioned masses in both sides of the abdomen. The second plate was made after the intravenous injection of diodrast and revealed the kidneys in their normal position, conclusively eliminating the possibility of bilateral prostatic kidneys with calculi.

The white blood cell count was 20,200; polymorphonuclears 80 per cent; and lymphocytes 20 per cent. The Kahn serologic test and urinalysis were negative.

Feeling that the diagnosis was justified and that nothing could be accomplished except by surgery, the abdomen was opened through a lower midline incision and the pelvis explored.

The uterus was softened and enlarged to about the size of a four months pregnancy. The left ovary was completely replaced by a cyst measuring about 10 by 6 by 5 cm. It was twisted on its pedicle and somewhat discolored. The

portion of the tube involved in the torsion was extremely edematous but the proximal portion of the tube was normal. The cyst was excised and the pedicle ligated.

A similar cyst was found involving the right ovary, except that it was lying free and the pedicle was not twisted. At this point in the operation we paused

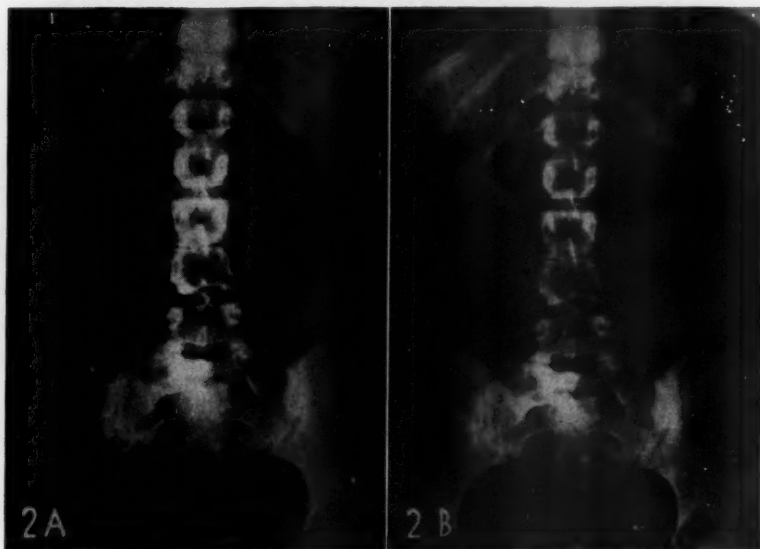


Fig. 2a. The unretouched flat plate following intravenous diodrast shows the outlines of the kidney pelves in their normal positions, conclusively eliminating the possibility of ptosed kidneys with calculi.

Fig. 2b. For the sake of clearer definition the kidney pelves in 2a have been outlined with wax pencil and arrows are seen pointing to them as well as to the radiopaque masses in Figure 1.

briefly to consider the possible outcome of removing or leaving the second dermoid cyst. I felt that extirpation might be responsible for the speedy termination of her illegitimate pregnancy. On the other hand, the continued presence and growth of the cyst might produce a number of undesirable effects: 1. Torsion constituting surgical emergency; 2. Dystocia, or even rupture of the uterus; 3. Rupture of the cyst during labor, with consequent multiple implantations. After weighing these possibilities, I removed the second cyst, believing that alternative comprised the lesser evil.

No definite corpus luteum could be found in either cyst. The cysts weighed about 448 Gm. The pathologic diagnosis was bilateral dermoid cysts with beginning gangrenous change in the left.

The patient's convalescence was uneventful. She was discharged from the hospital in twelve days. During her stay in the hospital she received two injections of 1 international unit of progesterone (proluton). It was suggested to her family physician that some form of corpus luteum be administered to her regularly throughout the remainder of her pregnancy. He prescribed a

tablet containing 3 grains of ovarian residue plus small amounts of pituitary, suprarenal and thyroid, three times daily.

The pregnancy progressed normally and on Feb. 26, 1939, five months after operation, she was delivered at home by her physician of an 8 pound baby girl who was apparently normal in all respects.



Fig. 3a. The dermoid of the right ovary.



Fig. 3b. The dermoid of the left ovary. Note discoloration due to circulatory changes secondary to torsion of cyst pedicle.

On April 25, 1939, the patient reported to the Clinic for examination. She stated that she had begun to be nervous, with shaking, numbness and itching, soon after operation. This condition had continued more or less since, being apparently somewhat relieved by the tablets.

The breasts were large and lactating, with no masses or tenderness. The wound had healed well and there was no evidence of hernia. The bimanual



examination revealed a parous introitus with good perineal support. The cervix was slightly softened. There was very little discharge. The mucous membrane appeared approximately normal. The uterus was small, measuring probably 2.5 by 4 cm. It was anteverted and in good position. There were no palpable adnexa.

#### DISCUSSION

Many articles are being written about dermoid cysts. This fact in itself should stress their importance. By means of quotation and brief reference to a number of selected papers, I shall summarize the recent literature.

Galif<sup>4</sup> in 1935 and again in 1937 stressed the value of x-ray in the diagnosis of ovarian cysts, especially of dermoid cysts. He reported a case of a dermoid cyst diagnosed by x-ray in which operation later proved the diagnosis.

Domenchini<sup>5</sup> in 1937 reported an ovarian cyst twisted on its pedicle with a uterine pregnancy. He discussed the difficulty in arriving at a correct diagnosis: before operation the mass in this case had been considered an extrauterine pregnancy.

Chimenti<sup>6</sup> in 1937 warned of the frequency of diagnostic errors in regard to ovarian tumors. He cited a case which was diagnosed at various periods in its development as fecaloma, pregnancy, vesicular mole and finally extrauterine pregnancy. The value of a good history was stressed.

In a paper on twisted ovarian cysts in children, Mazel and Halpern<sup>7</sup> reported that previous to 1905, 60 cases of tumors of the ovary in children had been reported, but since that time another 38 had been added. The greatest number occurred in the ages of 10 to 14 years.

Reporting a dermoid cyst in a girl, aged 10, they concluded that repeated attacks of abdominal pain in children justify complete study comparable to that given adults. The authors suggested that rectal examination is of utmost importance in children with abdominal pain, and that x-ray is of value if the patient has been catheterized. They believed that the high frequency of malignancy encountered in ovarian tumors in children demanded surgical intervention in all such cases.

According to Ewing<sup>1</sup> malignant processes develop in about 3 per cent of dermoids and commonly lead to invasion of the peritoneum. These secondary processes take the form of pseudomyxoma peritonei, or numerous cellular nodules, or more diffuse pelvic growths of sarcomatous type. Ewing further stated that in bilateral dermoids malignant processes appear to be comparatively frequent.

In 1938 Thorlaesen<sup>8</sup> reported a strangulated dermoid cyst in a child of 6½ years. In the differential diagnosis, acute intussusception, volvulus of the sigmoid, acute pelvic appendicitis and Meckel's diverticulitis had been considered.

Cabot Case 22522<sup>9</sup> was the report of a 63 year old American housewife with pain in the abdomen for a month prior to admission, and pain in the left lower back which was worse when standing on her feet. The clinical diagnosis was acute appendicitis, or possibly torsion of an ovarian cyst. The pathologic diagnosis was dermoid cyst of the ovary.

In March 1937, Deligtisch and Vernick<sup>10</sup> reported a case of dermoid cyst with twisted pedicle simulating renal colic. They detailed the case of a woman aged 42 who had lower abdominal pain of moderate character for 18 years. It became severe in intensity and finally developed into a typical colicky pain in the right lumbar region. The pain radiated to the right side of the abdomen and down along the inner side of the right thigh, was associated with nausea and vomiting and closely resembled the clinical picture of renal colic. At operation the right ovary was found to be a cystic mass with four twists of a gangrenous pedicle. The pathologic diagnosis was dermoid cyst.

These authors recall that Polack referred to ovarian dermoids as especially prone to torsion of the pedicle and he also stated that dermoids comprise 10 per cent of all ovarian tumors.

In 1938 Hastings<sup>11</sup> reported a case of pregnancy associated with dermoid occurring in a girl 16 years of age. The first diagnosis had been retroverted gravid uterus. A later diagnosis was a simple ovarian cyst. A dermoid cyst was removed without disturbing pregnancy.

Wilson<sup>12</sup> of the Department of Obstetrics and Gynecology at the University of Rochester, discussed the influence of corpus luteum hormone upon pregnancy. In each of his five patients abortion occurred after removal of corpus luteum in pregnancy.

However, Wilson quoted Ask-Upmark as having seen 17 examples of pregnancy continuing to term although bilateral oophorectomy had been performed during the early stages (during the first month in 3). He also stated that Pratt had recently reported 2 cases in which the corpus luteum had been removed in the first month and that both pregnancies went to term normally. He recalled that Earheart in 1934 and McGinty in 1936 recovered appreciable amounts of progesterin from the human placenta and quoted McGinty as follows: "While the corpus luteum may not be essential for the continuance of human pregnancy, one cannot conclude

that the luteal hormone is dispensable from that observation alone, since the placenta may produce its own progesterin."

Wilson advises delaying operation until the middle of pregnancy unless there is a definite reason for removing ovarian tumors earlier. This, of course, does not apply in the case of torsion, which represents an acute emergency and immediate operation is indicated. His discussion brought out that often the corpus luteum of pregnancy had been removed without causing abortion.

Bernard Notes<sup>13</sup> of the Department of Obstetrics and Gynecology, George Washington University, in June 1938 stated that a review of the literature revealed but three reported cases of pregnancy complicated by bilateral dermoid ovarian cysts. All of these patients carried to term, with delivery of normal children. He cited a case; Mrs. K., 34 years old, complaining of continuous aching in both lower abdominal quadrants and amenorrhea of 3 months duration. At 3½ months bilateral dermoid cysts were removed under nitrous oxide-ether anesthesia. The postoperative course was uneventful and the pregnancy was not disturbed. No endocrine therapy was given. Transient edema and elevation of the blood pressure was noted in the ninth month. Labor was normal.

Notes quoted Schockaert as saying, "We should diminish the importance that has been attributed to corpus luteum verum in sustaining pregnancy." To prove this contention Schockaert reported four cases of single ovarian cysts bearing corpus luteum and complicating pregnancy, which were extirpated, and one case which had bilateral ovarian dermoid cysts removed in the fifth month of pregnancy. All five ended normally at term. Notes reviewed the three previously reported cases of bilateral dermoid cysts complicating pregnancy, first of which E. Levy Solal treated successfully by cesarean section and bilateral oophorectomy. The second one previously reported by J. L. Faure, was that of a woman 6 weeks pregnant and having bilateral dermoids which were extirpated, with preservation of pregnancy until term. The third case was one reported by Cottalorda in which a bilateral oophorectomy and hysterectomy were performed. Notes concluded that the corpus luteum verum was not absolutely necessary for the preservation of pregnancy, but that in the absence of urgent indication, operative intervention should be delayed at least until the placenta is approximately mature.

#### CONCLUSIONS

1. Dermoid cysts occur with greater frequency than they are suspected.
2. Their pedicles are prone to torsion.

3. They may be found in the very young or the very old.
4. Their diagnosis presents a problem which can be correctly solved with careful history taking, thorough physical examination, including rectal and vaginal examination, and the intelligent use of the x-ray.
5. A cyst with torsion of the pedicle may produce symptoms simulating a number of other painful conditions in the abdomen.
6. In the presence of lower abdominal pain in the female, one should always think of the possibility of a cyst with a twisted pedicle.
7. In the case of dermoids, it would seem obvious that when diagnosed in the absence of pregnancy, their early removal is indicated on account of the possibility of malignant change.
8. In the presence of early pregnancy, if the cyst is diagnosed and not strangulated, it is probably wise to wait until three or four months have passed before attempting surgery.

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## THE RATIONALE OF SPLENECTOMY IN THE TREATMENT OF CERTAIN ANEMIAS

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IT is the purpose of this discussion to present from the surgical clinic as well as from the hematologic laboratory further evidence which, by clarifying the pathologic physiology involved, has added to the rationale of splenectomy in the treatment of certain anemias which occur in man.

There are various factors concerned with the physiology of the human spleen which become of surgical significance in evaluating the role played by the spleen in the development of these anemias. Among them should be mentioned: the phagocytic action of the pulp clasmotocytes upon the red blood cells; the preservation of the ferric portion of the hemoglobin, which is eventually transported to the liver through the splenic vein; the "sequestration effect" which removes many red blood cells from the active circulation and may even maintain them within the "reservoir" afforded by the splenic pulp spaces; a more subtle and ill understood effect by which the spleen appears to inhibit bone marrow hemopoiesis; and finally a newly discovered lytic effect which certain splenic extracts appear to exert upon the blood platelets. Thus anemia may result from different perversions of the normal splenic physiology.

It is commonly thought that the spleen is an organ of mystery and that the function of the human spleen represents a great gap in our medical knowledge. It is true that *much* remains to be learned; nevertheless, modern physiologic hematology has made truly remarkable advances so far as clearing our concepts of the pathogenesis of certain anemias is concerned. As a consequence the surgical removal of the spleen, long practiced, has become even more definitely indicated in the treatment of certain anemias. While the indications for splenectomy have thus been sharpened, they have also been extended.

It is the plan of this discussion briefly to review certain of the findings of our Ohio State group, particularly as relating to splenectomy in the treatment of congenital hemolytic icterus, thrombopenic purpura, Banti's syndrome or "splenic anemia," and hypoplastic anemia. The frequent pigment cholelithiasis of congenital hemolytic icterus, as well as the relation of the accessory spleen to the recur-

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rence of an anemia subsequent to the splenectomy, will also be considered.

#### CONGENITAL HEMOLYTIC ICTERUS

Congenital hemolytic icterus appears to offer the clearest indication for splenectomy. The results are immediate and lasting and the operative mortality is low. Too, splenectomy may be safely accomplished even during the acute exacerbations.

Congenital hemolytic icterus may be recognized when the patient is first seen by the presence of a moderate icterus, an anemia with a resultant peculiar waxy pallor and a palpable spleen. The principal confirmatory laboratory findings include the occurrence of many small spherical erythrocytes—a microcytosis; increased numbers of undeveloped red blood cells containing nuclear fragments—a reticulocytosis; an increased tendency of the red blood cells to be hemolyzed in dilute salt solutions,—an increased fragility;—and an increased icterus index.

*The Genetic Factor:* Congenital hemolytic icterus is an inherited disease. It may be transmitted from either parent to the children of either sex. It is thus genetic, that is to say, it is carried to succeeding generations in those minute divisions of the chromosomes known as genes. While this concept may seem far afield, nevertheless, it has a definite clinical bearing. For example, doubt may arise concerning the diagnosis of congenital hemolytic icterus, and particularly during the acute exacerbations or in young children. In these instances a study of the blood of the direct near-relatives should be made. If this reveals the characteristic stigmas—small spherical red blood cells, an increased number of reticulocytes or an increased fragility of the red blood cells—confirmatory evidence is thus<sup>o</sup> obtained. Moreover, clinically, search may be made in the near relatives for a history of unexplained icterus or anemia, a lifelong unusual pallor or an enlarged spleen.

Splenectomy in either parent with the disease, will not prevent its development in children of either sex conceived *after* removal of the spleen. Such instances are well-recognized. This offers further evidence of the genetic nature of congenital hemolytic icterus.

Keeping this in mind, it would appear that the manifestations of the disease which we face are particularly those of hypersplenism and essentially an increased phagocytic activity of the splenic pulp cells for erythrocytes. This may be actually demonstrated by taking the warm spleen at once from the operating room and examining pulp smears on a warm stage by the supravital technic. In this manner one actually sees the hypersplenism, in the increased and highly phagocytic clasmatoocytes.



Nevertheless, these are phagocytic reticulo-endothelial cells, and they exist in other parts of the body, for example, in the lymph glands, in the liver, in the bone marrow and in the hemolymph glands. The bearing of these facts will be discussed in connection with the accessory spleen.

*Accessory spleens* occur more frequently in man than is generally recognized. Their gross appearance and histologic structure is similar to that of the normal organ. During the course of our 61 splenectomies we have noted from one to nine accessory spleens. They vary greatly in size and in location. By a curious embryologic anomaly they may even attach to the ovary or testicle, and be subsequently carried down into the pelvis or scrotum. Such instances are very rare.

It is known that these accessory spleens may enlarge subsequent to the splenectomy, either experimentally or clinically. It is also recognized that in thus enlarging, they, too, may assume a pathologic function and thus reinduce the clinical syndrome for which the primary splenectomy was originally accomplished. Thus, it becomes of importance to search for and remove accessory spleens during the course of the splenectomy, in order to prevent a recurrence of the disease for which removal of the spleen was originally indicated.

Recurrence of the symptoms of congenital hemolytic icterus or of thrombopenic purpura subsequent to splenectomy is occasionally encountered. Instances are reported. I have seen one. In this child of four the primary splenectomy was successfully accomplished during an acute hemoclastic crisis in September, 1933. Return of the characteristic symptoms and of the diagnostic blood findings was noted about four years later. Exploration of the abdomen in February, 1938 revealed two small accessory spleens. Removal of these has again resulted in clinical improvement.

While the occurrence of an accessory spleen is usually responsible for the recurrence of congenital hemolytic icterus or of thrombopenic purpura, nevertheless, other factors should be kept in mind. The hemolymph glands are intermediate in structure between the lymph glands and the spleen. Too, lining their sinuses are phagocytic reticulo-endothelial cells. It is consequently reasonable to suspect them where the recurrence is otherwise unexplainable. In man they are usually retroperitoneal. Further study should be made of this unusual possibility, owing to the persistence of the genetic background.

*Acute Hemoclastic Crises:* Our first splenectomies for congenital hemolytic icterus were accomplished after prolonged daily observations of the fluctuating levels of the various blood cells. These established the usual range of daily variation and served as a control

baseline from which to evaluate the results of splenectomy. Charts of these studies have been published. On the day of splenectomy blood studies were made more frequently, at intervals of from 15 to 30 minutes throughout the day. These revealed a significant discovery, that the major increase in erythrocytes and hemoglobin follows *immediately* the removal of the spleen. Subsequent studies then revealed that this was not an occasional finding, and that it ensued regularly whenever sufficient observations were made. This amounted essentially to an "autotransfusion." It thus became a significant surgical fact that the anemia of congenital hemolytic icterus is *immediately* improved by splenectomy. The mechanism by which this occurs has been presented at length by Dr. Charles A. Doan in his Beaumont Lectures.

A consideration of the advisability of attempting splenectomy during the acute and at times fulminant exacerbations of blood destruction, commonly known as "hemoclastic crises," naturally followed. Experience of others in the past had taught that the "crises" were a direct contraindication to splenectomy. Nevertheless, we had evidence of the major role played by the spleen as well as the knowledge of the immediate improvement of the anemia following removal of the erythroclastic spleen. As a consequence, I have accomplished nine splenectomies during the critical phases of congenital hemolytic icterus with the loss of but one patient. This evidence points directly to the hypersplenism, and further supports the rationale of splenectomy in the treatment of congenital hemolytic icterus.

Approximately two-thirds of those patients with congenital hemolytic icterus have gallstones. These increase in incidence with age. Thus patients may present also abdominal symptoms, ranging from a mild epigastric distress to even a superimposed obstructive jaundice. The gallstones so commonly present are as a rule of an unusual variety. They represent largely masses of blood pigment; formed in the spleen by the increased breakdown of red blood cells; transported to the liver; excreted in the bile in increased concentration and finally agminating within the gallbladder. However, they may be associated with cholesterol deposits, for example as a nucleus, or even be covered with calcium deposits. Frequently they are dark, irregular, craggy and fragile.

*The prophylactic effect* of accomplishing the splenectomy, *when once the diagnosis is established*, early in life, should receive serious consideration. Four factors are involved: the first concerns the prevention of the common subsequent formation of pigment gallstones: the second concerns the prevention of the acute hemoclastic crises, which may be precipitated by various causes, for example by an

acute severe infection, by trauma, or by another surgical operation; the third concerns preventing the debilitating effects of the prolonged anemia. We have seen this delay the healing of fractures and of non-specific ulceration; and fourth, the splenectomy may be accomplished with less difficulty and less hazard.

The enlarged spleen of congenital hemolytic icterus is ordinarily not adherent. In this it contrasts sharply with the enlarged spleen of Banti's disease. In those older cases where there has been a perisplenitis, however, its capsule may adhere tightly to the diaphragm. In these instances it has been found possible to accomplish a subcapsular separation, controlling the oozing splenic pulp with hot packs.

#### THROMBOPENIC PURPURA

The relationship between decreased blood platelets and certain hemorrhagic diseases was recognized fifty years ago, by Denys in 1887. However, it was not until twenty-nine years later when Kaznelson advised and Schloffer accomplished, in November, 1916, the first splenectomy for what then was termed "thrombocytolytic purpura." Kaznelson based the rationale of splenectomy upon the hypothesis that the spleen actively destroyed the thrombocytes. Nevertheless, while recognizing the value of splenectomy in the thrombopenic diseases, his contemporary Frank, as well as subsequent investigators were not in accord as to the mechanism by which the beneficial effects were brought about. They assumed that the decrease in platelets was originally due to some inhibitory action by the spleen upon their production in the bone marrow.

Two principal views are thus current concerning the pathogenesis of the thrombopenia. At present the majority of clinical students favor that of lysis by the spleen.

Recent experimental work, however, has further clarified this point. Troland and Lee have shown that the spleens removed from three patients with thrombopenic purpura contained a substance which reduced the platelet count of normal rabbits' blood, sometimes as much as 90 per cent. Four control extracts, prepared in a similar manner, from thyroid tissue, a myomatous uterus, a spleen from a patient with Banti's syndrome and a spleen of congenital hemolytic icterus, yielded no similar effect. However, the manner in which this resultant thrombopenia is brought about remains for further investigation. Moreover, others have been unable to confirm their findings.

"Hemorrhagic purpura" is difficult to define accurately as a circumscribed disease entity, since investigators have thus far recognized no single causative factor. Moreover, the pathologic findings

are not always the same, and often may be indefinite. As a consequence its differential diagnosis may be difficult to establish. Among the disturbing factors may be mentioned those which affect capillary permeability, the spontaneous remissions which are known to occur, the acute exacerbations which may even threaten life and the beneficial effects of blood transfusions. Moreover, in a multiplicity of states the purpura is symptomatic.

Nevertheless, certain definite findings may be presented as a basis for making a diagnosis of "thrombopenic purpura." These have been assembled by Doan as follows: (a) low platelet count or no platelets at all; (b) prolonged bleeding time; (c) normal clotting time; but (d) failure of the clot to retract; (e) spontaneous petechiae or those readily induced by the tourniquet test; (f) leukocytosis or perhaps reticulocytosis, which would rule out a general marrow hyperplasia; and (g) the absence of abnormalities in the red or white cells indicative of pernicious anemia or leukemia, or of any other foreign cellular metaplasia, such as metastatic carcinoma within the bone marrow, which would inhibit the activity of the megakaryocytes.

Splenectomy for "thrombopenic purpura" of this type is recognized as a sound surgical procedure, since it is based upon the principle of correcting a pathologic physiology. Numerous are the reports which attest to its success. However, it should be recognized that the differential diagnosis is of importance. Nevertheless, there are two points which we may add to further substantiate such a procedure: (1) that splenectomy may be safely accomplished during that acute phase of the disease which is commonly known as a "crisis," and (2) that the occurrence and subsequent enlargement of an accessory spleen may clarify certain recurrences subsequent to successful splenectomy.

Experience in the past has shown a high mortality when splenectomy was attempted during the acute phases of the disease. As a consequence it became an accepted surgical teaching that splenectomy was contraindicated in these states. On the other hand, Marsh's analysis of these earlier failures showed that prior to 1925 preoperative blood transfusions were not employed, save for one patient, who recovered. Moreover, during the succeeding five years four additional recoveries, of patients transfused immediately preceding the splenectomy, were reported.

Our own experience substantiates the importance of preoperative transfusions. The platelet count does not appear to be of prognostic significance. Too, it appears that the normal red cell and hemoglobin levels are re-established with greater certainty by splenectomy than by repeated blood transfusions. Four out of five of our patients

subjected to splenectomy during acute exacerbations have survived. In all four the bleeding tendency ceased at once and has not recurred.

The postoperative rise in the platelet count, as has been demonstrated in our charts, was irregular. The initial and immediate rise was presumably due to the removal of the spleen. The subsequent secondary rise, after a decrease, may well have been the result of removing some inhibitory effect upon the activity of the megakaryocytes. One patient is clinically well after six years. Twenty-one months after the splenectomy she gave birth to a normal female child. No recurrence of the bleeding tendency was noted at that time, nor since; however, it is of interest that the infant had a decreased platelet count.

#### BANTI'S SYNDROME

Banti's syndrome or "splenic anemia" presents, although not so clearly, an indication for splenectomy. This is best accomplished during the early stages of the disease. During the later stages the enlarged spleen becomes unusually adherent to the surrounding viscera. The increased vascularity, particularly due to venous engorgement, also makes for technical difficulties. The morbidity and mortality of splenectomy in the later stages are high. Consequently, ligation of the splenic artery, inside the origin of the major pancreatic artery, is to be considered. It is of some value although not so effective as splenectomy.

#### HYPOPLASTIC ANEMIA

The majority of those patients upon whom we have accomplished splenectomy have shown postoperatively an increase in both erythrocytes and platelets. These findings were at first evaluated on the basis that the spleen actively destroys these formed elements circulating within the blood stream. Nevertheless, the *sustained* increase, observed in following the blood picture for months and even years, has warranted another assumption; that some inhibitory influence upon bone marrow hemopoiesis is at the same time removed.

Patients with hypoplastic anemia present a slowly progressive bone marrow aplasia which presumably involves the entire marrow. This may be readily demonstrated by biopsy or by marrow puncture. Under these conditions it seemed rational that the spleen, even though normal in size, might well reduce even further the available number of circulating erythrocytes and platelets, through the activity of its hemolytic and inhibitory functions. In certain of these patients, moreover, the thrombopenia may even reach such a point that hemorrhages occur. Splenectomy in these patients would thus physiologically aid in restoring the disturbed hemolytopoietic bal-



ance, although to a lower level than normal owing to the impaired bone marrow.

As a consequence we have advised and accomplished splenectomy upon ten selected patients with hypoplastic anemia. All survived the operation without complications. The subsequent improvement has been variable, both as to time and degree; nevertheless, it has been encouraging. One of our patients, operated upon in 1934, is still alive and improved. Another patient, presenting hypoplastic anemia secondary to benzol poisoning, was managed medically for a year and a half, yet the thrombocytes remained persistently low. Splenectomy resulted in a restoration of the cellular equilibrium and an unusual and maintained clinical recovery.

It is evident, however, that splenectomy for hypoplastic anemia does not consistently yield the striking beneficial effects that follow removal of the spleen in thrombocytopenic purpura, or in congenital hemolytic icterus. Its results are palliative rather than curative, and it gives surgical aid rather than relief, since the impaired bone marrow remains. The degree of functional recovery would consequently appear to depend upon the available mesenchymal tissue within the marrow, which by forming new primitive cells would aid in increasing hemopoiesis.

On the other hand, some improvement ensues in these patients since they maintain for varying lengths of time a higher average level of platelets and erythrocytes; require subsequently fewer transfusions and appear to attain a longer life expectancy.

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## COMPLETE INDIRECT INGUINAL HERNIAS

### A Study of 305 Hernias and Repairs

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**I**NCLUDED in this study were 305 complete indirect inguinal hernias, all of which were operated upon. Of this group, 204 were followed for periods of nine months or longer and 4 recurrences discovered, which gave a recurrence rate of 1.9 per cent.

All inguinal hernias in which the sac was found to be continuous with the tunica vaginalis were included in the list of complete indirect inguinal hernias. This name was used instead of congenital indirect inguinal hernias since all those hernias described as having been noted as present at birth but in which the sac was not continuous with the tunica vaginalis were classified as incomplete indirect inguinal hernias. A classification based upon anatomic findings at the time of operation rather than upon the history, which is often inaccurate, was considered much more satisfactory, although, undoubtedly a certain proportion of the incomplete inguinal hernias were congenital.

Included in this series were 2 hernias in females which extended into the labium majus and had been noted as present at the time of birth of those 2 patients.

The time covered by this study was the twenty year period from 1916 to 1935 inclusive. The hernias comprised all those admitted to the wards at St. Luke's Hospital from 1926 to 1935 inclusive. Only those having been repaired and followed postoperatively for nine months or longer, or until a recurrence was discovered, were included in the study from the ten year period, 1916 to 1925 inclusive.

#### ETIOLOGIC FACTORS

The inaccuracy of using the time at which a hernia was first noted as the time of onset of that hernia is well demonstrated by the figures in table 1. Only 43.4 per cent were noted at the time of the patients' births. The proportions first noted in the successive five year groups from 1 day to 20 years of age were practically the same in each group, the figures ranging only from 10.9 to 9.2 per cent. From the age of 20 years on, each successive five year group presents a decreasing incidence. The oldest patient at the time a complete indirect inguinal hernia was first noted was 63 years of age.

Undoubtedly, a number of these hernias, which had been present for these various lengths of time, may never have had either intes-

TABLE 1  
AGE AT WHICH HERNIA WAS FIRST NOTED

Age Group	Total Hernias	Per Cent of Entire Group	Number Followed Post-Operative	Number of Recurrences	Per Cent Recurrences
Noted at birth.....	132	43.4	91	0	0.0
To 5 years.....	31	10.2	18	1	5.5
5 - 9.....	33	10.9	26	0	0.0
10 - 14.....	28	9.2	21	0	0.0
15 - 19.....	28	9.2	19	1	5.3
20 - 24.....	21	6.9	9	0	0.0
25 - 29.....	10	3.3	4	0	0.0
30 - 34.....	9	3.0	6	1	16.7
35 - 39.....	7	2.3	6	1	16.7
40 - 44.....	3	1.0	2	0	0.0
45 - 49.....	1	0.3	1	0	0.0
50 - 54.....	1	0.3	1	0	0.0
55 - 59.....	0	0.0	...	..	...
60 - 63.....	1	0.3	0	..	...
Totals.....	305	100.0	204	4	1.9

Average age at which complete indirect inguinal hernias were first noted was 9.0 years.

TABLE 2  
AGE AT TIME OF OPERATION

Age Group (Years)	Total Hernias	Per Cent of Entire Group	Number Followed Post-Operative	Number of Recurrences	Per Cent Recurrences
0 - 5.....	46	15.0	28	0	0.0
5 - 9.....	47	15.3	29	1	3.3
10 - 14.....	54	18.0	42	0	0.0
15 - 19.....	46	15.0	35	1	2.8
20 - 24.....	36	11.8	22	0	0.0
25 - 29.....	29	9.5	17	0	0.0
30 - 34.....	13	4.2	6	1	16.7
35 - 39.....	15	4.9	11	1	9.1
40 - 44.....	6	2.0	4	0	0.0
45 - 49.....	3	1.0	1	0	0.0
50 - 54.....	6	2.0	6	0	0.0
55 - 59.....	2	0.6	2	0	0.0
60 - 64.....	1	0.3	1	0	0.0
65 - 70.....	1	0.3	0	..	...
Totals.....	305	100.0	204	4	1.9

Average age at which patients with complete indirect inguinal hernias were operated upon was 16.2 years.

tinal or omental content until the day it was first noted. However, the greater number were probably both palpable and visible, pre-

vious to the time they were first noted, had the patients been more observant.

The number of recurrences was too small to give an accurate picture of the probabilities of recurrence according to the age when the hernia was first noted. However, by grouping them into twenty year periods it is found that the recurrence rate is seven times greater when hernias were repaired that were first noted when the patients were between the ages of 20 and 40 years than when they were under the age of 20 years. Beyond the age of 40 years, too few hernias were first noted for the absence of recurrences to have any particular significance.

Although 43.4 per cent of these hernias were noted at birth and 53.6 per cent in the first five years of life, only 15.0 per cent were repaired when the patients were under 5 years of age. The figure was the same, 15.3 per cent, for the second five years of life; 20 per cent greater, 18.0 per cent, for the third; and the same, 15.0 per cent, as the first two for the age group 15 to 20 years. From the twentieth year on the incidences of the patients' ages at the time of operation decreased.

The five year periods each showing a recurrence were the same in tables 1 and 2, with the exception of one in the second five year group instead of the first. The recurrence rate, 3.6 per cent for those repairs done when the patients were between 20 and 40 years of age was nearly two and one half times as great as when the patients were under the age of 20 years at the time of operation. Again the number of repairs on patients 40 years of age or over was too small for the absence of recurrences to have any particular significance.

TABLE 3  
SEX

Sex	Total Hernias	Per Cent of Entire Group	Number Followed Post-Operative	Number of Recurrences	Per Cent Recurrences
Male .....	303	99.3	202	4	1.9
Female .....	2*	0.7	2	0	0.0
Totals.....	305	100.0	204	4	1.9

\*These 2 hernias were present at birth and extended into the labium majus pudendi.

The sex incidence was predetermined at practically 100.0 per cent for males by the definition set up for this group of hernias. The 2 hernias in females, as previously stated, were included because they extended into the labia and were noted as present at birth.

TABLE 4  
COLOR

Race	Total Hernias	Per Cent of Entire Group	Number Followed Post-Operative	Number of Recurrences	Per Cent Recurrences
White .....	277	90.8	191	4	2.1
Black .....	26	8.5	11	0	0.0
Yellow .....	2	0.7	2	0	0.0
Totals.....	305	100.0	204	4	1.9

Taking into consideration the relatively small number of hernias in this group and resultant inaccuracies of percentages, the race incidence is not essentially different from that found in incomplete indirect inguinal hernias. In both instances these incidences checked closely with the proportions of these races among the general admissions to the hospital. The numbers of repairs in the negro and yellow patients were too small for the absence of recurrences to have any particular significance.

TABLE 5  
HISTORY OF DEFINITE TRAUMA AS ETIOLOGIC FACTOR

Trauma as Etiology	Total Hernias	Per Cent of Entire Group	Number Followed Post-Operative	Number of Recurrences	Per Cent Recurrences
Absent .....	283	92.8	187	1	0.5
Positive .....	22	7.2	17	3	17.7
Totals.....	305	100.0	204	4	1.9

It is most interesting to note that of the hernias of this type, first called to the patient's attention after the age of 15 years, 26 per cent were described as having been caused by a definite trauma. This is essentially the same percentage as that found with the incomplete indirect inguinal hernias, 27 per cent.

Also of interest is the fact that 3 of the 4 recurrences in the entire group occurred in those patients who gave a history of trauma as the cause of the hernia although this group made up only 7.2 per cent of the total complete indirect inguinal hernias. No satisfactory explanation of this fact presents itself other than the fact that these patients were in the older age groups and probably the majority of them did heavy work following the repairs.

#### SYMPTOMATOLOGY

A history of pain associated with the hernia was given in 35.7 per cent of these hernias as contrasted to the figure of 49.7 per cent for the incomplete indirect inguinal hernias.

TABLE 6  
HISTORY OF PAIN ASSOCIATED WITH HERNIA

<i>History of Pain</i>	<i>Total Hernias</i>	<i>Per Cent of Entire Group</i>
Absent .....	196	64.3
Positive .....	109	35.7
Totals.....	305	100.0

TABLE 7  
DURATION  
(Time Hernia Was First Noted to Time of Admission or Operation)

<i>Duration</i>	<i>Total Hernias</i>	<i>Per Cent of Entire Group</i>	<i>Number Followed Post- Operative</i>	<i>Number of Recurrences</i>	<i>Per Cent Recurrences</i>
To 1 week.....	12	3.9	7	0	0.0
To 1 month.....	30	9.8	17	1	5.9
First 6 months.....	66	21.3	41	2	4.9
Second 6 months.....	35	11.5	23	0	0.0
To 1 year.....	101	33.1	64	2	3.1
0 - 5 years.....	168	55.1	105	4	3.8
5 - 9 years.....	33	10.8	24	0	0.0
0 - 9 years.....	201	65.9	129	4	3.1
10 - 19 years.....	53	17.4	38	0	0.0
20 - 29 years.....	34	11.2	27	0	0.0
30 - 39 years.....	11	3.6	6	0	0.0
40 - 49 years.....	4	1.3	2	0	0.0
50 - 59 years.....	2	0.7	2	0	0.0
Totals.....	305	100.0	204	4	1.9

Average elapsed time from when complete indirect inguinal hernias were first noted to time of admission or operation (duration) 7.2 years.

Counting the duration of these hernias as the time from when they were first noted to the time of operation, the average figure, 7.2 years, was nearly twice that found in the case of the incomplete indirect inguinal hernias, 3.9 years. Of course the actual average duration was the average age of the patients at the time of operations. This figure was 16.2 years.

The number of recurrences was too small to present any evidence as to a possible relation between the duration and probability of recurrence.

## PHYSICAL FINDINGS

TABLE 8

SIZE

Size of Hernia*	Total Hernias	Per Cent of Entire Group	Number Followed Postoperative	Number of Recurrences	Per Cent Recurrences	Operative Deaths 1926-1935	Mortality
Size I**	40	13.1	26	0	0.0	0 in 27 operations	0.00
Size II**	65	21.3	46	1	2.2	0 in 43 operations	0.00
Size III	200	65.5	132	3	2.3	0 in 130 operations	0.00
Totals	305	100.0	204	4	1.9	0 in 200 operations	0.00

\*Size I: Those hernias in which the sac was limited to the inguinal canal.

Size II: Those hernias in which the sac extended beyond the external ring but not into the scrotum.

Size III: Those hernias in which the sac extended into the scrotum.

\*\*All size I and II hernias were associated with undescended testicles.

That in this group of hernias there were a fair number which were not scrotal was due to the association of a certain proportion with undescended testicles, 34.4 per cent. The incidence of Sizes I and II\*, 13.1 and 21.3 per cent respectively, were only half as great as the corresponding incidences for incomplete hernias. Correspondingly, the incidence of Size III\* (scrotal) hernias, 65.5 per cent, was twice that found with incomplete indirect inguinal hernias.

The figures for recurrences in Sizes II and III\*, 2.2 and 2.3 per cent respectively, would indicate that this eventuality is to be expected more frequently when the sac extends beyond the external ring, but the number of recurrences included in the study was too small for these figures to be conclusive.

The figures given in table 9 are not essentially different from those found with incomplete indirect inguinal hernias. The number of recurrences was too small to give any indication as to probabilities of recurrence in these various groups although the increased incidence of recurrences on the right side as compared to the left was definite as contrasted to incomplete hernias, the figures being for complete 2.5 per cent right and 1.1 per cent left, for incomplete right 7.0 per cent and left 7.5 per cent.

\*Those hernias in which the sac was limited in extent to the inguinal canal were classified as Size I, those in which the sac extended through the external inguinal ring but not into the scrotum as Size II, and those in which the sac extended into the scrotum as Size III.



TABLE 9  
UNILATERAL AND BILATERAL\*

	Total Hernias	Per Cent of Entire Group	Number Followed Post- Operative	Number of Recurrences	Per Cent Recurrences
Unilateral—right .....	140	46.0	94	3	3.2
Unilateral—left .....	89	29.3	62	1	1.6
Total—unilateral .....	229	75.3	156	4	2.6
Total—bilateral .....	75	24.7	49	0	0.0
Total—right .....	178	58.4	118	3	2.5
Total—left .....	127	41.6	87	1	1.1
Totals .....	305	100.0	204	4	1.9

\*Each hernia was counted individually. Each complete indirect inguinal hernia was considered one of two bilateral inguinal hernias when there was or had been an inguinal hernia of any type on the opposite side.

TABLE 10  
MULTIPLE HERNIAS

Associated with 305 complete indirect inguinal hernias were:	
Umbilical hernia alone with unilateral indirect inguinal .....	3
Umbilical and epigastric with unilateral indirect inguinal .....	1

4 complete indirect inguinal hernias were each associated with 1 or 2 hernias of types other than inguinal (1.3%).

Hernias of types other than inguinal were noted as being associated with 1.3 per cent of the complete indirect inguinal hernias as compared to 1.5 per cent of the incomplete type.

TABLE 11  
INCARCERATION AND STRANGULATION

Incarcerated or Strangulated	Total Hernias	Per Cent of Entire Group	Number Followed Postoperative	Number of Recurrences	Per Cent Recurrences	Operative Deaths 1926-1935	Mortality
Neither .....	272	89.2	181	4	2.2	0 in 179 operations	0.00
Incarcerated* ...	28	9.1	21	0	0.0	0 in 17 operations	0.00
Strangulated* ...	7	2.3	4	0	0.0	0 in 4 operations	0.00
Totals .....	305	100.0	204	4	1.9	0 in 200 operations	0.00

\*Strangulation developed in 2 old incarcerated hernias.

The incidences of both incarceration and strangulation were 50 per cent greater with complete than with incomplete indirect inguinal hernias. This difference is readily accounted for in that a much

greater proportion of this type of hernia has a long sac with a narrow opening into the abdominal cavity. But this same explanation was not applicable to association of pain with the presence of the hernias as a considerably smaller proportion of the complete hernias presented this symptom than did the incomplete indirect inguinal hernias (table 6).

The numbers of both incarcerated and strangulated hernias were too small to give conclusive figures as to the probability either of recurrence or of operative mortality associated with repair in the presence of these conditions.

#### RESULTS ACCORDING TO TYPE OF REPAIR

These figures were not assembled as they could not possibly give any indication as to the value of any given type of operation since the number of recurrences was so small. A majority were repaired by transplantation of the cord external to the conjoined tendon,

TABLE 12  
CIRCULATORY POSTOPERATIVE COMPLICATIONS

Complication	Total Operations	Per Cent of Entire Group	Average Stay in Hospital Postoperative (Days)	Number Followed Postoperative	Number of Recurrences	Per Cent Recurrences	Per Cent Infected Wounds	Deaths	Per Cent Mortality
1. Hematomas .....	7	2.3	17.3	7	1	14.3	0.0	0	0.0

TABLE 13  
RESPIRATORY POSTOPERATIVE COMPLICATIONS

Complication	Total Operations	Per Cent of Entire Group	Average Stay in Hospital Postoperative (Days)	Number Followed Postoperative	Number of Recurrences	Per Cent Recurrences	Per Cent Infected Wounds	Deaths	Per Cent Mortality
1. Acute bronchitis .....	4	1.3	16.0	2	0	0.0	0.0	0	0.0
2. Pulmonary atelectasis..	3	1.0	13.7	2	0	0.0	0.0	0	0.0
A. Atelectasis—									
right lung .....	2	0.7	14.5	1	0	0.0	0.0	0	0.0
B. Atelectasis—									
left lung .....	1	0.3	12.0	1	0	0.0	0.0	0	0.0
3. Common cold .....	2	0.7	19.0	0	..	..	0.0	0	0.0
4. Bronchopneumonia ....	2	0.7	18.0	0	..	..	0.0	0	0.0
5. Acute otitis media.....	2	0.7	30.0	2	0	0.0	0.0	0	0.0
6. Retropharyngeal abscess	1	0.3	26.0	0	..	..	0.0	0	0.0
Totals.....	14	4.6		11	1	9.1	0.0	0	0.0

although a number nearly as great were repaired without transplantation of the cord. Other types of operations were used in small percentages of repairs, depending upon the conditions found about the inguinal canal at the time of operation.

### POSTOPERATIVE COMPLICATIONS

Repairs of this type of hernia were followed by postoperative complications in 9.1 per cent as compared to 10.4 per cent in the case of repairs of incomplete indirect inguinal hernias.

The order of incidence of the various complications was essentially the same in the two groups. There was no mortality associated with any of these complications.

Respiratory complications followed 4.6 per cent of these repairs as compared to 7.3 per cent of the repairs of incomplete indirect inguinal hernias. Circulatory complications developed in practically the same percentage of patients in the two groups, 2.3 per cent for the complete hernias and 2.8 per cent for the incomplete.

Infection developed in only 1.0 per cent of the operative wounds as compared to 3.5 per cent of the incisions in repairs of the incomplete indirect inguinal hernias. This is readily understood in that a

TABLE 14  
POSTOPERATIVE COMPLICATIONS

Complication	Total Operations	Per Cent of Entire Group	Average Stay in Hospital Postoperative (Days)	Number Followed Postoperative	Number of Recurrences	Per Cent Recurrences	Per Cent Infected Wounds	Deaths	Per Cent Mortality
1. Hematomas .....	7	2.3	17.3	7	1	14.3	0.0	0	0.0
2. Acute bronchitis .....	4	1.3	16.0	2	0	0.0	0.0	0	0.0
3. Wound infections .....	3	1.0	17.0	3	0	0.0	...	0	0.0
4. Pulmonary atelectasis...	3	1.0	13.7	2	0	0.0	0.0	0	0.0
A. Atelectasis—									
right lung .....	2	0.7	14.5	1	0	0.0	0.0	0	0.0
B. Atelectasis—									
left lung .....	1	0.3	12.0	1	0	0.0	0.0	0	0.0
5. Common cold .....	2	0.7	19.0	0	..	...	0.0	0	0.0
6. Bronchopneumonia ....	2	0.7	18.0	0	..	...	0.0	0	0.0
7. Acute otitis media.....	2	0.7	30.0	2	0	0.0	0.0	0	0.0
8. Retropharyngeal abscess	1	0.3	26.0	0	..	...	0.0	0	0.0
9. Suppurative cervical									
adenitis .....	1	0.3	26.0	0	..	...	0.0	0	0.0
10. Pyelitis .....	1	0.3	20.0	0	..	...	0.0	0	0.0
11. Cystitis .....	1	0.3	20.0	0	..	...	0.0	0	0.0
12. Jaundice .....	1	0.3	16.0	1	0	0.0	0.0	0	0.0
Totals.....	28	9.1		17	1	5.9	0.0*	0	0.0

\*Excluding those patients whose only complication was wound infection.

greater percentage of longer and more extensive operations were required in the latter repairs as compared to the greater proportion of shorter and more simple repairs in the former.

### OPERATIVE MORTALITY

In the group of 200 consecutive repairs performed from 1926 to 1935 inclusive, there were no operative or postoperative deaths.

### FOLLOW-UP DATA

TABLE 15  
FOLLOW-UP DATA  
(A)

Total number of hernias studied.....	305
Total—no operation .....	0
Total operations .....	305
Total operative deaths .....	0
Total—no follow-up examination .....	61
Total—follow-up less than 9 months—no recurrence.....	40
Total—follow-up 9 months and over (incl. recurrences).....	204
Average follow-up time—all cases 9 months and over.....	37.5 months
Total recurrences .....	4
Average time recurrences were first noted postoperative.....	43.5 months
Percentage of recurrences—9 months and over follow-up.....	1.9
<hr/>	
Total number examined postoperatively.....	244
Average follow-up time—all followed cases.....	32.4 months
Total recurrences .....	4
Percentage of recurrences—all followed cases.....	1.6
<hr/>	
Recurrences—Indirect .....	25.0%
Direct .....	75.0%

TABLE 15  
FOLLOW-UP DATA  
(B)

Length of Follow-Up Time*	Total Operations Followed	Per Cent of All Followed Operations	Total Recurrences Discovered	Percentage of Total Recurrences	Recurrence Percentage for Group
Under 9 months.....	40	13.1	1	25.0	2.5
9 months to 1 year....	18	5.9	1	25.0	5.6
<hr/>					
Under 1 year.....	58	18.9	2	50.0	3.5
1 to 2 years.....	46	15.1	1	25.0	2.2
2 to 3 years.....	81	26.6	0	0.0	0.0
3 to 5 years.....	18	5.9	0	0.0	0.0
5 to 10 years.....	21	6.9	0	0.0	0.0
10 to 15 years.....	18	5.9	1	25.0	5.6
15 to 22 years.....	2	0.07	0	0.0	0.0
Totals.....	244	100.0	4	100.0	1.6

\*Cases included in each group only when the period of follow-up time was ended by failure to return again for follow-up examination or by the discovery of a recurrence.

Of the 305 complete indirect inguinal hernias studied, all were repaired. Of these, 61 did not return for follow-up examination and 40 were followed for periods of time of less than nine months without a recurrence having been discovered. Of the 204 followed for nine months or longer, 4 developed recurrences, giving an incidence of 1.9 per cent.

The average length of follow-up time for the 204 followed for nine months or longer was 37.5 months. The average time at which recurrences were first noted was 43.5 months postoperatively, although 3 of the 4 recurrences were discovered within the first two years.

Of the 4 recurrences 3 were direct and only 1 indirect. The proportion in the case of repairs of incomplete hernias was 3 direct to 2 indirect recurrences.

#### CONCLUSIONS AND COMMENTS

Statistics have been given which were developed in a study of 305 complete indirect inguinal hernias, all of which were repaired.

Although this is a congenital condition less than half were noted at birth. The average age at which they were first noted was 9.0 years. The average age at which they were repaired was 16.2 years, which gives an average apparent duration (time elapsed from the time they were first noted to the time of operation) of 7.2 years although the average actual duration was 16.2 years.

As a group, a smaller percentage of these hernias was associated with pain than was found to be the case with the incomplete hernias. However, in contrast to this finding, greater percentages developed incarceration or strangulation.

The percentages of postoperative complications were not materially different in the two groups, complete and incomplete indirect inguinal hernias, although wound infection developed only one third as frequently after repair of complete hernias as followed the repair of incomplete hernias.

There was no appreciable difference in the incidence of bilateral hernias in the two groups.

The percentage of recurrences found in a nine month or longer follow-up was only 1.9 per cent as compared to 7.2 per cent for the incomplete hernias. The recurrences were 75 per cent direct and 25 per cent indirect as compared to 60 and 40 per cent for the incomplete hernias.

#### REPAIR OF COMPLETE INDIRECT INGUINAL HERNIAS

Satisfactory results are to be expected following repair of this type of hernia without transplantation of the cord, provided this

type of repair is reserved for those patients in which the structures forming the inguinal rings and canal are normal. This restriction will be found to limit this type of repair in a large degree to the younger patients.

Also, under ordinary circumstances, when a repair is being done at the same time as the first stage in an undescended testicle operation, if that repair is performed without transplantation of the cord, the undescended testicle operation will be facilitated.

When abnormal conditions of the internal ring, the floor of the inguinal canal or the condition of the conjoined tendon are present, the repair must be chosen which will meet the requirements of the individual hernia in each instance as in the repair of any indirect inguinal hernia.

1213 Medical Arts Bldg.



## THE RELATIONSHIP OF UNILATERAL KIDNEY DISEASE TO HYPERTENSION

### Report of a Case Cured by Nephrectomy

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UNTIL quite recently hypertension was considered a disease which was so complicated in its origin that only in isolated cases could anything be done about it. In certain medical circles it was thought a bit ridiculous to attempt to treat hypertension, for it was argued it is the reaction of the body, and particularly of the heart and arteries to some sort of obstructive force, and, therefore high blood pressure is a protective mechanism. The patient was told that he "had high blood pressure," and that this was not a dangerous condition so long as his arteries remained soft and his heart unimpaired. Hypertension in general is not recognizable by any specific or characteristic symptom or set of symptoms. Hypertension, it must not be forgotten, is in certain instances physiologic, and, therefore, the normal reaction of the heart and arterial system to effort. An athlete under strain and effort always has increased blood pressure. The athlete who collapses on the track or at the finish line does so because his blood tension collapsed first. This is true of all bodily strain in every type of bodily worker from piano movers to circus performers. Only when increased blood pressure continues after bodily effort has ceased is it considered hypertension and therefore pathologic.

When we enter the pathologic states of increased blood pressure we encounter a long list of known causative factors, such as (1) advanced Bright's disease or chronic nephritis, (2) eclampsia, (3) poisoning with lead or other metals, (4) accompanying the paroxysms of gout, (5) in acute asphyxia, (6) suprarenal tumors, (7) lesions which compress the brain, as inflammatory lesions or tumors of the brain, (8) pituitary disease, (9) prostatic hypertrophy, and (10) endocrine imbalance. These causes may be considered as causes of acute hypertension.

Essential hypertension or hyperpiesia may not come within our consideration, although it is in quest of the cause of this disorder that most of the experimental researches have been made. To narrow the field of hyperpiesia or essential hypertension is ever the goal of the researchers. In 1934, Harry Goldblatt published an account of how he and his associates were able to produce hypertension experimentally. They showed that constriction of the main arteries

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to the kidneys in dogs was invariably followed by elevation of the systolic blood pressure as determined in the carotid artery, and this increase persisted for as long as fifteen months. Great permanent constriction of large arteries in other parts of the body did not produce significant elevation of the systolic blood pressure. These workers felt that the mechanism of the hypertension had not yet been explained by their work. They suggested that complete denervation of the kidneys before the clamps were applied to the renal arteries might give some clue to some impulses which might influence the vasomotor apparatus. In line with this thought, Frank Glenn and his associates of Cornell published some experimental work in 1937 and again in 1938. In this work, the experimental kidneys were denervated and transplanted and then the clamp applied to the renal arteries. They were able to confirm Goldblatt's work in spite of the denervation. Alfred Adson of Rochester, Minnesota, in discussing Glenn's paper said that he thought that there was some pressor substance which was not eliminated. Freeman and Page of New York, in 1937, published studies based on experimental work proving that sympathectomy did not prevent the development of hypertension in 7 dogs.

In 1937, Goldblatt stated that excision of the ischemic kidney at the height of the hypertension which was caused by the constriction of one renal artery is followed by prompt return of the blood pressure to normal. There was no doubt then that in the experimental field hypertension could be produced in dogs and cured by the removal of the ischemic kidney. The parallel between this work and clinical cases in human beings is too close to be long overlooked by the clinicians. As long as ten years ago we ourselves encountered two cases of renal tumor of the hypernephroma type in patients with hypertension. Upon making this discovery we were highly excited because we thought possibly the removal of this kidney tumor would produce a fall in the blood pressure. In neither case was the hypertension altered in the slightest degree. One patient died after about a year. The second patient, a woman, has kindly lived ten years. She still has her hypertension. During 1938 and 1939 a number of very strikingly interesting cases have been published to prove that in patients who are the victims of unilateral kidney disease and hypertension, removal of the diseased kidney produces a cure of the hypertension. One of the first cases thus reported was by C. Holmes Boyd and Lloyd C. Lewis.

Their case was a white man, aged 31, who was first seen on August 20, 1936, complaining of headaches and blurring vision. He weighed about 200 pounds. Eleven weeks before admission he developed severe abdominal pains in the left lower quadrant associated with nausea and vomiting. He had an appendectomy under spinal

anesthesia seven weeks before admission. The patient had passed a life insurance examination three years before admission, and there was no history of a previous hypertension. After the appendectomy he developed hypertension and was said to have had a blood pressure of 180/100, and shortly after that there was a reduction in the vision of his right eye. After examination Dr. Lloyd Lewis concluded that the diagnosis was a left adrenal tumor. Lewis and Young, together, made a bilateral exploration of the adrenals and kidneys. Both adrenals were found to be normal and the left kidney was found to be normal. The right kidney was thought at first to be a tumor but then the diagnosis, as the kidney was uncovered, was changed to an infarct and a nephrectomy was carried out. From the time of operation in August 1937, he was followed until March 1938 at which time he had a blood pressure of 124/84. This was one of the very first cases published in which there was a unilateral kidney disease accompanied by hypertension which was cured by a nephrectomy.

The second case was one by W. F. Leadbetter and Carl E. Burkland. Their case was a colored boy, 5½ years of age. He had a history of hypertension from six months of age and an enlarged heart was noted. Studies at the age of 3 years disclosed an ectopic pelvic kidney. There was no evidence of pyelonephritis or coarctation of the aorta. The blood pressure was persistently elevated. The experimental studies of Goldblatt suggested that there might be a relationship between the abnormally situated kidney and the hypertension. Nephrectomy was carried out and the blood pressure returned to normal. This 5½ year old boy was one of twins, delivered by breech extraction on May 7, 1932. At three years of age his blood pressure was 170/110, in the left arm, and in his right arm was 145/85. In December 1937, he still had his hypertension. On Jan. 26, 1938, a nephrectomy was carried out on the pelvic ectopic kidney. This kidney weighed only 50 Gm. which is only about one half of the weight of a normal kidney for this age child. There was found to be an occluding mass which extended from the artery in such a way that it had the same effect as a Goldblatt clamp. This patient's blood pressure returned to normal. The conclusion was that there was an anomalous blood supply to a pelvic ectopic kidney which produced ischemia due to the partial obstruction of the renal artery.

N. W. Barker and Waltman Walters published a case in February 1938. Their patient was a man, aged 42 years, who came to the clinic in November 1937. His symptoms were increasing nervousness, slight shortness of breath, and an occasional mild morning headache, all of about one year's duration. His renal history was of interest. In 1925, he had an attack of right renal colic with hematuria. In 1931, he had several similar attacks. In 1933, the renal colic had

recurred with severe episodes of chills and fever. A large stone was found in the mid portion of the right ureter. A right ureterolithotomy was performed for the relief of this stone. There was a large hydronephrosis and hydroureter above the obstruction of the stone. At that time he had been free from further renal symptoms but his urine had always shown pus cells and red blood cells, and there had been apparently an impassable stricture of the right ureter. Cystoscopic examination showed the left kidney to be entirely normal. There was an impassable stricture in the upper part of the right ureter. The blood pressure reading on first examination was 230/135. Numerous pressure readings taken over a considerable period of time showed an average level of 180/125. A right nephrectomy was performed by Dr. Walters and a contracted kidney about 48 Gm. in weight was found. Its surface was nodular with numerous projections a few millimeters to one centimeter in diameter. The patient made an excellent recovery. He was out of bed on the tenth day following the operation and left the hospital on the fourteenth day. Three hours after the operation the blood pressure was 230/140. From that time until the eleventh postoperative day there was a regular decline of blood pressure to 140/100. In February of 1938, it was stated that the patient had gone back to work and that his blood pressure two months after the operation was still 130/90. This is another of the very striking cases in the literature.

Another interesting case was published by J. W. McIntyre in June 1939. His patient was a white male, aged 34, who was seen first in December 1936. His complaint was that he had been rejected by a doctor at one of the steel plants because he had high blood pressure. He had no complaints at all but came in for examination because of his blood pressure which was 180/104 on admission. Some readings were as high as 220/130. The urine showed a trace of albumin in the morning but none at any other time. The urine also showed about three pus cells per high power field. On one examination there were a few red blood cells. The patient then disappeared and returned to the care of this author in May of 1938 with a complaint of pain in his left flank, fever and vomiting of one week's duration. During the interim he had not had any blood pressure readings made. His blood pressure at that time was 168/94. Cystoscopy was done. Indigocarmine appeared in five minutes on the right side and ten minutes on the left side. Culture showed a staphylococcus albus from both the left kidney and the bladder. The right kidney showed no growth. A left pyelogram was made using 15 c.c. of 12.5 per cent sodium iodide solution. In June of 1938, a left nephrectomy was done. The specimen was examined by Dr. Goldblatt. The kidney was one with a reduplication of the pelvis of the non-communicating type, the renal artery had a thick-

ened wall, and the microscopic studies showed chronic pyelonephritis but no evidence of arteriolar disease. The patient was out of bed on the twelfth postoperative day and was discharged from the hospital in July of 1938. His blood pressure reading had dropped from an average of 178/102 to 132/84 at the time of discharge. In April 1939, his blood pressure was 134/78.

#### REPORT OF CASE

A white printer and linotype operator, aged 36, entered the hospital on Nov. 11, 1939 and was discharged as cured on Feb. 17, 1940.

His complaints on admission were (1) diminished urinary output, (2) shortness of breath (dyspnea, and orthopnea), and (3) swelling of the abdomen, feet and ankles. He stated that his immediate present illness had begun with a severe cold contracted in July 1939. He continued to work but felt very bad. He noticed that he had what he called asthma the last of July. His condition had gradually become worse during the past months. His teeth were bad he said, and he had begun having them taken out three months ago. Weakness and shortness of breath, with edema of legs and feet followed this procedure.

He had always had difficulty in starting his urinary stream. He had had a "quinsy" sore throat in 1922 after which his tonsils had been removed. In 1924, he began to have pain in his left upper quadrant which he presumed to be his left kidney. An attempt was made by a competent urologist to pass a ureteral catheter to this left kidney. The kidney was found to be the seat of a very large hydronephrosis. A nephrostomy was done and the patient wore a tube for 10 months. An attempt was made at the time the nephrostomy tube was placed to remove the kidney but the operator was unable to do so. The nephrostomy was a compromise. About a year later another surgeon attempted a nephrectomy and was content with what he called a partial nephrectomy. The patient was in the hospital for 7 weeks following this operation.

After his last admission to the hospital, there was considerable pus in the urine, at times as much as 7,000 pus cells per cubic millimeter. Daily urine analysis showed many days with pus free urine. His urine showed albumin, casts and sometimes red blood cells on almost every examination. Phenolsulphonphthalein test in 15-minute fractions showed—first period 38 per cent, second period 4 per cent, third period 8 per cent. Intravenous urograms showed a good functioning right kidney with normal outline and pyelogram, but the left showed no function. His blood picture was normal on admission.

Cystoscopy revealed that the left kidney was probably nearly completely dead as it excreted no indigocarmine. There was a very dense stricture of the ureter which was penetrated by using a wire stylet in a number 4 olivary ureteral catheter. We were able to aspirate a small quantity of pus laden urine from this left side and we were also able to make a satisfactory pyelogram which showed an irregular outline suggestive of an infected hydronephrosis of the type due to an aberrant blood vessel.

His blood pressure is shown on the chart. It averaged over 180/120 from the time of admission to the day of operation, a period of 58 days. He had marked edema of his ankles, legs and thighs, and fluid in his abdomen as well as edema of the face. Electrocardiograph showed a very low electromotor force and indicated a right coronary occlusion. However, this electrocardiograph



must have been an error, although we are perfectly willing to concede that his heart was in serious difficulty before the operation. In addition to all this he was quite irrational.



Fig. 1. Showing the left kidney as the seat of a hydronephrosis due to an aberrant renal vessel. The kidney was an infected shell. It was removed by sharp dissection two previous attempts by good surgeons having been made.

When I was called in consultation and asked if I could do a nephrectomy on this patient things looked pretty hopeless. I counseled to wait for a more favorable time. This we did and the patient improved somewhat and then started to decline again. We felt that it was bad either way. The patient finally decided us to try a nephrectomy because he begged us so hard to operate, stating that if we would get him off the table alive he would live. Such spirit and courage was not to be denied and we undertook the operation. Since two competent surgeons had been unable to remove this kidney on two different attempts I knew it would be difficult. The operation was simply a question of sharp dissection of a very large thin hydronephrotic sac off the diaphragm, the peritoneum, the psoas muscle and the descending colon until we were able to mobilize the kidney and free the pedicle. An aberrant artery to the lower pole was found obstructing the ureter, and the probable cause of all the trouble to this kidney. The operation took 55 minutes. The patient was given transfusions and oxygen for three days following the operation.

On the fourth day it seemed certain that he would die since he had put out practically no urine. We took another long chance and gave him some novasurol (brand of merbaphen) which produced fine results, causing an output of nearly 4 liters of urine within 24 hours, and also causing the disappearance of his edema within the next three days. On the eighth postoperative



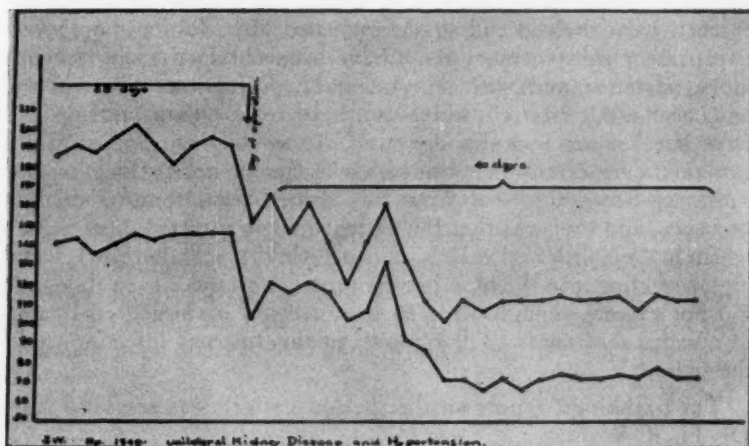


Fig. 2. Blood pressure curve covering a period of 98 days. The average systolic pressure before operation was 180. After operation the pressure gradually fell until it stabilized at 110/70. For a period of 80 days the patient has been perfectly well.

day his temperature was normal. He was rational for the first time in more than 25 days.

His blood pressure fell alarmingly immediately following the operation but increased as he recovered but again slowly fell to normal. On the twelfth postoperative day it was 110/70 and has never been higher than that.

His recovery has been complete in every way. He has a normal urine now, no pus, no casts, no albumin, and feels fine. He left the hospital on the fortieth postoperative day.

#### COMMENT

It is the first time I have ever done a nephrectomy under such circumstances. I have removed kidneys with impunity from patients with chills and fever. Never before, however, have I operated upon a patient who had a bad heart, edema of the extremities, and fluid in his abdomen, and who was delirious. On these grounds alone it is a remarkable case. The fact that his hypertension was cured makes it even more amazing.

Goldblatt is credited with having said that if a kidney is functionless it is not likely to be the cause of hypertension. Here was a kidney which was functionless to intravenous diodrast and to the dyes. Its ureter was apparently completely occluded yet when the kidney was removed the patient recovered from his hypertension. One would not exactly call this type of disease an ischemic kidney. It has long been known that saline extracts of normal kidney substance would act as pressor substances and increase blood pressure. These properties were said to be due to a substance called renin. This was apparently forgotten in the nearly seventy year interval but has

recently been revived and again confirmed. In addition more effective pressor substances or renin have been obtained from ischemic kidneys from animals with experimental hypertension. Also extracts have been made from the kidneys of hypertensive human beings and have been effective in this direction. It would seem impossible to explain the hypertension in this case by ischemia, nor yet by a pressor substance being absorbed from this kidney. One thing is certain, however, and that was that the patient had an infected dead kidney which had viable blood vessels in its pedicle. It was, therefore, capable of sending into the blood stream toxic substances even though it did not excrete enough urine so that it could be measured by any of our dye substances. The removal of this focus of infection cured the patient.

The pathologic report on the specimen which was removed is by Dr. H. R. Wahl:

**GROSS APPEARANCE:** The specimen consists of what was apparently a cystic structure which has previously been opened in such a way that the original structure is quite obscure. The specimen weighs 60 Gm. and measures 17 by 7 by .3 cm. The specimen apparently represents a massive hydronephrosis but no definite kidney tissue is demonstrated. What appears to be the ureter runs along one side of the external surface of the specimen, and this is crossed near its origin by an aberrant blood vessel.

**HISTOLOGICAL PATHOLOGY:** The section shows some compressed and flattened and atrophic renal tissue in which many of the glomeruli are fibrosed and hyalinized. The convoluted tubules cannot be recognized as such but there are numerous spaces which are lined by irregular polyhedral and cuboidal shaped cells, some of which are desquamated into the lumen. Some of these cells appear to be hyperplastic and show some heaping up. The stroma is increased in amount and often hyalinized. The vessels of the corticomedullary junction show considerable thickening of their wall, especially in the subintimal layer. The lining of the pelvis is flattened and beneath this there is considerable round cell infiltration. One of the sections shows a number of vessels and vascular spaces which are surrounded by some fatty tissue. Section through one of the vessels shows the wall to be considerably thickened.

**DIAGNOSIS:** Large hydronephrosis with pressure atrophy due to aberrant renal vessel.

#### SUMMARY AND CONCLUSION

In considering unilateral kidney disease as one of the causative factors in hypertension it seems a fruitless labor to include all the cases of supposed pyelonephritis with hypertension. Only a small percentage of pyelonephritis cases show hypertension and these usually occur toward the end of such a patient's life. If one studied a hundred cases of pyelonephritis, undoubtedly a certain percentage of them would have a hypertension. A hundred cases of any disease is likely to show hypertension as a complication in a few cases. In this paper I have included only cases of proven unilateral kidney disease, the patient's remaining kidney being good

enough to warrant nephrectomy. The proof of the whole matter is that when such a patient was subjected to nephrectomy he recovered and his hypertension was cured. Nor does it seem to me to be profitable to include the cases that have come to autopsy and reasoning backward into the living, conclusions are drawn that here was an ischemic kidney or kidneys, or there was a sclerotic vessel to the kidney which simulated a Goldblatt clamp producing an ischemia.

So for purposes of this discussion I have purposely narrowed the thesis to the published proved cases which so far number four. The case herewith presented is the fifth. Doubtless there have already been others. We trust that surgeons will continue to exercise good judgment and not remove good kidneys because they might be ischemic.

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## SOUTHERN SURGEONS: YESTERDAY, TODAY AND TOMORROW

R. L. SANDERS, M. D.

Memphis

IT is with sincere appreciation that I acknowledge the honor which you conferred upon me in electing me your President. I have not been unmindful of the responsibilities of the office, and shall always cherish in memory the opportunity of serving you. It has been a year full of interesting activity and pleasant experiences, and your steadfast, cordial support in my efforts to promote the interests of this Congress has been a source of inspiration. I am profoundly grateful for the benefits which I have enjoyed from your trust.

The privilege of addressing you tonight affords me an opportunity to gratify a long cherished desire: that of paying tribute to the worth and accomplishments of the surgeons of our Southern States. It seems to me no more appropriate subject could be found for this gathering than one which deals with Southern surgeons and Southern surgery; with the surgeons of the past and their influence upon the development of our science; with the state of affairs in which we of today find ourselves; and with the problems and prospects which lie ahead for those of the future. I therefore first invite you to look with me into the mirror of the past, to recall the difficulties which our predecessors encountered, to examine briefly the contributions to surgical progress made by some of the more distinguished Southerners, and from their reflection, attempt to discern the pathways which we must pursue in the further advancement of our profession.

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Presidential Address delivered before the Eleventh Annual Assembly of The Southern Surgical Congress, Birmingham, March 11, 12 and 13, 1940.

## YESTERDAY

The progress of surgery to its present stage has been made possible by three distinct developments: anesthesia, asepsis, and scientific principles of operative technic. All of these were not only originated, but were refined to a high degree during the latter half of the Nineteenth Century. Thus, incredible though it seems, within the short space of a few decades surgery was transformed from little more than a craft whose followers labored in a Stygian darkness resounding with the cries of the suffering and the moans of the dying, into a science and art whose enlightened devotees bring easeful healing to countless multitudes. And enlightenment began with the discovery of anesthesia.

Despite the fact that Sir Humphrey Davy, in 1799, had suggested the inhalation of nitrous oxide for the relief of pain during surgical operations, and Henry Hill Hickman, in 1829, had attempted without success to demonstrate the anesthetic properties of nitrous oxide to the medical profession of both England and France, until the middle of the Nineteenth Century the general attitude toward anesthesia had not changed since the days of Hippocrates. Even as late as 1839, Velpeau voiced the popular belief in his statement:

To escape pain in surgical operations is a chimera which we are not permitted to look for in our day. A cutting instrument and pain in operative medicine are two words which never present themselves the one without the other in the minds of patients, and it is necessary for us surgeons to admit their association.

Living as we do in a world wherein scientific investigation is encouraged to the utmost, and any new discovery which seems likely to have value is given every test, it is difficult to realize the indifference and unbelief encountered on every hand by those who brought forward new ideas in medicine and surgery in that pre-scientific era. Such an attitude certainly provided no incentive to research. One can well understand why the possibilities of nitrous oxide and ether remained unrecognized, although both had for many years been widely used in the treatment of respiratory disorders. But Velpeau was as blind to the future as to the past, for only three years later Crawford W. Long, of Georgia, was to use ether as an anesthetic agent in surgery, and seven years later anesthesia was to be given to the world.

Long's epoch-making discovery is a familiar story to all Southern surgeons. It is regrettable that he did not make known earlier his experiences with ether. Through this neglect, years were lost before he was acclaimed one of the greatest individual benefactors of mankind. Not at once, however, did the profession appreciate the value of his discovery. The eyes of the majority were still blinded by the



darkness in which they had been groping throughout the ages. Then, gradually, surgeons everywhere, impressed with the reports of a few enthusiastic experimenters, began using the drug, and eventually there could be no doubt that anesthesia, "The greatest single gift ever made to suffering humanity," had come to stay.

Yet, as time soon proved, anesthesia did not meet all the requirements of safe surgery. Although far more difficult operations were performed with materially less danger to the lives of patients, there was still something radically wrong with a surgical practice which involved a mortality of 33.3 per cent. An English surgeon, Joseph Lister, concluded that the cause lay in infection and, guided by the recent discoveries of Pasteur, that the infection was incited by micro-organisms. Acting upon this premise, he set to work to prevent the ravages of these invisible agents of destruction, using, first, carbolic acid as a medium and subsequently other less dangerous substances. So gratifying were his results in the simple surgical procedures currently performed, that he decided to apply his methods to more formidable operations. Again, his efforts were crowned with success, and the second step in the progress of surgical science was taken.

Lister's work was greeted with the same ignorance and opposition with which the introduction of anesthesia had met. Such revolutionary theories were looked upon as pure fallacy. Nevertheless, the rapid recovery of increasing numbers of patients from operations previously considered too hazardous to be attempted finally convinced his most stubborn opponents, and bread poultices came to be supplanted by antiseptic gauze in the treatment of wounds. Following Lister's lead, forward-looking surgeons in other parts of the world soon added many improvements to his methods, and asepsis superseded antiseptis.

Aided by the development of antiseptis and facilitated by the use of anesthetics, new methods of surgical technic were being studied in both Europe and America. Asepsis was the last prerequisite to the refinement of these principles; it removed the final barrier to surgical progress and opened wide the doors to the future, and in the fullness of light, the transformation of surgery into a science and art was completed.

It is difficult to imagine the handicaps against which surgeons struggled prior to this new era. Until the beginning of the Nineteenth Century, American medicine and surgery had made no particular progress beyond the establishment of a few colleges, notably at Philadelphia, New York and Boston. The instruction in these institutions compared favorably with that afforded in Edinburgh and Oxford, since the professors were for the most part educated in those old world centers of learning, yet surgical training was



extremely limited. Teaching was confined almost entirely to lectures. There was little, if any clinical and laboratory instruction. Physiology, insofar as it related to surgery, was unrecognized, and pathology was conspicuously lacking from the curricula. Anatomy was the principal study of prospective surgeons. In fact, a familiarity with anatomy, a certain amount of manual skill, a few simple tools, and a staunch spirit were regarded as practically the only essential requirements of the surgeon. And not the least of these was a staunch spirit. It was no less true at that time than in the days of Celsus that the good operator must possess the most unflinching courage, which could "disregard alike the sight of blood and the cries of the patient." One cannot but wonder at the boldness of those who could carry through an operation under the cruel circumstances which then prevailed, and marvel at the Spartan fortitude of those who submitted themselves to such treatment.

Despite these handicaps, within that dark realm of surgery were accomplished deeds of such heroic daring, such surprising success, and such infinite influence as to have won for their authors a place among the immortals whose names and deeds will be sung in the epics of our profession for all time. How gratifying that so many of these heroes have come from the South! Every page of surgical history bears the imprint of distinguished Southerners who have contributed in an incalculable measure to scientific progress. In fact, at the very forefront of this illustrious procession, in point of time and perhaps of deed as well, was that dauntless Southerner, Ephraim McDowell, who, in successfully performing the first ovariectomy, disproved all the theories hitherto prevalent in regard to the inviolability of the peritoneal cavity and inaugurated abdominal surgery. Surgeons of today, with every diagnostic facility at their command, with modern surgical equipment, with anesthesia and methods of asepsis, and with trained assistants, would do well to consider the conditions under which that operation was undertaken. Relying solely upon his God-given senses in making the diagnosis, with no equipment other than a wooden table, a knife, a few forceps, some crude ligatures and a pan of warm water, but, of not the least importance, with the faith and courage of his patient, Jane Todd Crawford, as his inspiration, he accomplished a feat at which the world will never cease to marvel.

Closely associated in the professional mind with the name of McDowell is that of Marion Sims, citizen of Montgomery, Alabama, the founder of gynecology. Who does not know of Sims' untiring search for a cure of vesicovaginal fistula? His repeated failures, the invention of the speculum and the wire suture, the fortitude of his subjects, his final success and subsequent triumph on two continents form a story as colorful as can be found in any volume of

fiction. Astonishing though it was, however, this was by no means the only achievement of that most versatile of surgeons. His removal of the mandible, repair of harelip, straightening of cross-eyes, correction of clubfoot, and treatment of gunshot wounds of the abdomen all bear witness to the scope of his genius.

In appropriate recognition of the contributions of McDowell and Sims to surgery, Dr. W. D. Haggard, Sr., wrote:

Gynecic surgery, with all its brilliant achievements, owes its present exalted position to the illustrious Sims no less than abdominal surgery owes its origin to the world-renowned McDowell. They conferred upon the South the honor of being the birthplace of gynecology, and the outcome of their labors has no parallel in the annals of surgery.

While surgeons should ever be mindful of their debt to McDowell and Sims for having opened up entirely new fields, they should not forget the homage due those others who, by their energy, courage, tenacity and sound judgment, became leaders of the profession, and by precept and example exerted an immeasurable influence upon surgical progress.

An acknowledged leader of the profession during the early part of the Nineteenth Century was another Kentuckian, Benjamin Dudley. Frequently spoken of as "the great Benjamin Dudley," his fame was based upon his exceptional ability as a lithotomist. Of chief importance to posterity, however, were the methods by which he obtained his remarkable results. Dudley had the rare insight to appreciate the necessity for a thorough course of preoperative preparation and the observance of strict cleanliness in surgical treatment. It was through the practice and teaching of these principles, long before they were recognized by others, that he contributed most to surgery.

Kentucky was also for sixteen years the home of Samuel David Gross, who, during his residence there, became known as the Nestor of American Surgery. A profound student, a prodigious writer, and an unexcelled teacher, there can be no doubt that Gross brought, not only to the youths under his tutelage at the University of Louisville, but to surgeons everywhere a broader concept of surgical problems than had hitherto been imagined. Being equally interested in medicine, he keenly realized the need of surgeons for a thorough grounding in pathology and physiology, and never ceased his fight for better courses in these subjects in the medical schools of the country. At the close of his life, his professional achievements were beautifully and aptly summed up by Dr. D. W. Yandell, a former pupil, in the inscription for the urn which bore his ashes:

He recast Surgical Science as taught in North America, formulated anew its principles, enlarged its domain, added to its art, and imparted fresh impetus to its study.

Of the outstanding Southerners of the previous generation, there are four whom we recall, not alone for their success as surgeons, but also for their influence in educational affairs of the South: Paul F. Eve, William Thompson Briggs, William David Haggard, Sr., and Hunter Holmes McGuire. Eve and Briggs, of Nashville, both pupils of Dudley, were widely esteemed as scientific authorities and were considered two of the ablest teachers in America. Haggard, also of Nashville, was the successful leader in the campaign for the extension of the medical course in our Southern colleges to three years, and subsequently to four years. McGuire, founder of the University College of Medicine at Richmond, was active in all affairs devoted to the advancement of surgery. These men were not originators in the strict sense of the word. They left no particular operation nor invention by which their names are known; yet, by the power of their personalities, the abundance of their culture, the breadth of their vision and the skill of their hands, they elevated Southern surgery to a plane which has not since been overreached.

This meeting tonight is in the city distinguished as the home of W. E. B. Davis, a young but conspicuous figure in surgical circles during the latter part of the Nineteenth Century. In his short career, Davis added in no small measure to our knowledge of intestinal and biliary tract surgery, and in his untimely death at the age of forty years, the profession lost one of its most brilliant and farsighted members. His chief interest was the promotion of surgical progress in the South as a whole, and though he did not live to realize the fruition of his plans, he laid the foundation upon which his confreres and successors have developed an admirable educational program for the betterment of Southern surgery.

The story of surgery in the South, and indeed in the whole world, would be essentially lacking without an account of the part played by those two gifted men who headed the original surgical faculty of the Johns Hopkins Medical School. It was William Stewart Halsted, the first occupant of the Chair of Surgery, who was largely responsible for establishing Johns Hopkins as one of the highest seats of medical education in the world.

Halsted's career at Johns Hopkins began at a time when surgical affairs were in a state of confusion. Anesthesia was in common use, but Lister's methods were practiced by only a few and were far from satisfactory even to these. In other words, anesthesia, even with antisepsis as conceived by Lister, had not succeeded in making surgery safe. The difficulty was concerned with both operative technic and the treatment of wounds. Halsted, therefore, by studying experimentally everything connected with surgical procedures, under-

took to discover the best methods of operation and of wound treatment. The outcome of his investigations was the development of a new school of surgery wherein technical perfection, i. e., the preservation of the blood supply by gentle handling of the tissues, thorough hemostasis, and the accurate coaptation of the wound edges, was recognized as essential to the prevention of infection and the promotion of healing. Then, as a crowning touch to asepsis, he introduced the use of rubber gloves at operation.

Not the least of Halsted's talents was a faculty for bringing out the best in his assistants, developing each according to his individual bent, but inculcating in them his own ideals and methods. Through such men as Finney, Bloodgood, Cushing and Mont Reid, the legacy of his genius has been handed to the profession of today.

While Halsted was making surgical history of one sort at Johns Hopkins Hospital, his colleague, Howard A. Kelly, was no less active in other fields. Kelly's creative ability found expression in many avenues of science, but it is for his researches and innovations in gynecology and urology that he will be best known to posterity. His numerous articles upon the various aspects of these subjects are almost encyclopedic in their store of information, and many of them, particularly those dealing with pathology and operative treatment, have already become classics.

Having himself an ingenious mind, Kelly has been quick to perceive the worth of new ideas advanced by others and to lose no time in putting them to the test. He was one of the first surgeons in the country to realize the possibilities of radium in the treatment of inoperable pelvic tumors and, accordingly, to popularize its adoption in practice. In fact, through his universal interests he extended the sphere of gynecology until hardly any corner remained unexplored. Along the pathways which he has cleared, his successors will travel more surely and more swiftly. Though more than eighty years of age and retired from active practice, he is still keenly alive to the interests of the profession. A little more than a year ago he honored by his presence the fiftieth anniversary meeting of the Southern Surgical Association in this city and in this hotel.

A contemporary of Halsted and Kelly was Lewis S. McMurtry, of Louisville. Early in his career McMurtry was strongly impressed by the life and work of McDowell, and it was this idealism, no doubt, which led him to pursue his medical studies at Edinburgh, as had his famous predecessor. Fortunately, he reached there just at the time when the ideas of Pasteur, Lister and Tait were first being put into practice, and he was therefore privileged to be among those who spread the new gospel of antisepsis to America.

Throughout his life a leader in the promotion of new and worthwhile developments in the field of surgery, he became an early and ardent advocate of the principles of surgical technic which were originated at Johns Hopkins, and was responsible for introducing them to the Ohio and Mississippi Valleys. As an exceptionally successful operator and a pioneer in surgical science and art, McMurtry singularly resembled that other Kentuckian whose life served as his inspiration.

#### TODAY

And so we come to our own day, which began, we may say, with the turn of the century. By that time, surgery had been completely revolutionized; the old order, wherein manual skill and speed were regarded as the criteria of excellence, had been replaced by an entirely new one in which perfection in science and art was the measuring rod of the surgeon. The groundwork was laid, and the period of construction and expansion had begun, and, in fact, had progressed to such a point that the necessity for specialization was becoming evident. Accordingly, with the new century, an increasing number of surgeons devoted themselves to study and practice in some particular field. This, in turn, led rapidly, not only to fresh discoveries in the old familiar fields, but to the development of entirely new branches of surgery. Genitourinary surgery became dissociated from abdominal surgery. In neurosurgery, which had previously been limited to the brain and spinal cord, extensive experiments were carried out, to the end that the most delicate operations could be performed, not only upon these organs, but upon the nerves arising therefrom as well. Thoracic surgery was introduced as an altogether new specialty, and orthopedic and plastic surgery, under the impetus of the war, assumed colossal proportions.

Southern surgeons are to be congratulated upon the part which they have played in this modern program. Many of those who had assisted in laying the groundwork were still carrying on, serving as an example for the new generation. They seem, however, to have belonged to the era of revolution rather than to the period of reconstruction. Several of their contemporaries, on the other hand, are regarded as belonging to the present day, since their achievements are linked as much with the future as with the past. By the grace of a beneficent Providence, two of the eldest of this group are still spared to the world, and so high are they held in the public as well as in the professional esteem that I should feel remiss were I to neglect this opportunity to add one more note to the paeans which have been sung in their praise.

It is not surprising that Rudolph Matas and John M. T. Finney, Sr., should have so much in common. Of approximately the same



age, one a native of Louisiana, the other of Mississippi, nurtured in the traditions of the old South, both are cultured in the broadest sense of the term. Alike devoted to the preservation of the noblest ideals of the profession, of which they themselves are the very embodiment, these two friends of many years grace the ranks of surgery as few have ever done. Not only are they master artists in the fields in which they specialize—Finney in abdominal surgery and Matas in vascular surgery—but they are thoroughly versed in other branches of medical and surgical science as well. And like all the truly great, they are blessed with a profound sense of humility, which has enabled them to keep "the common touch" and, as much as their professional ability, has served to make them loved and revered by all.

Those who know Matas never think of him merely as a great surgeon. Always associated is the thought of his culture, his charm and genuine loveliness. In one of thousands of similar tributes, a confrere well described the universal impression of Matas, the surgeon and the man:

His genius, like a bright jewel with many facets, has illuminated many of the dark places in surgery. To know him is to realize the heights of his idealism and to fall at once under the spell of his lovable personality.

Finney, no less than Matas, is a prophet honored both at home and abroad. A striking and unique evidence of the respect and devotion with which he is regarded was manifested in the dinner given by the entire city of Baltimore in celebration of his seventieth birthday. May many more good years be granted these two men of inborn nobility, sons of our Southland.

Among those whom, to our sincere regret, we may hold only in memory, there are two at whose feet I would tonight lay the laurels of our profession. Of the men whose careers coincided with our own, members of this Congress, none were more esteemed than C. Jeff Miller, brilliant exponent of modern gynecology, champion of the cause of better medical education, author and cultured gentleman; and William David Haggard, Jr., illustrious son of an illustrious father, scientist, scholar, teacher and humanitarian. Their fellow members will always miss them at the meetings of the Congress and will ever remember them as friends loved for their comradeship and surgeons venerated for their achievements.

Thus have been briefly presented some, though by no means all, of the leaders of surgical thought in the South to the present day. In recalling them and their accomplishments, it must not be forgotten that, indirectly, Southern surgeons and Southern surgery have been to a large extent the products of the schools in the East. One should therefore acknowledge a debt to those old masters, Philip



Syng Physik, the Father of American Surgery, Valentine Mott, John Syng Dorsey, Henry Jacob Bigelow, Nathan Smith, Gilman Kimball, Reginald Fitz, John B. Deaver, and a host of others from whom our Southern men have gained much of their training and inspiration.

Likewise, the South has every reason to honor that group of surgical giants who, following the spreading frontiers of the country, settled here and there through the North and West. Conspicuous among the number were Christian Fenger and his disciple, Nicholas Senn, John B. Murphy, Albert J. Ochsner, Dean Lewis, George W. Crile, and William J. and Charles H. Mayo. Every one of these men has immeasurably enriched surgical science in many of its branches, and the South has reaped a full share of the rewards of their efforts.

Having myself enjoyed the privilege of working with the Mayos, particularly with Dr. Will, I cannot forego a tribute to these illustrious brothers, so lately lost to the profession. Their very name is synonymous with all that is foremost and best in medicine and surgery. The institution which they founded is one of the most magnificent of its kind in the world, and in its organization are exemplified to a superlative degree the highest ideals of the healing arts. So long as those ideals survive, the spirit of Dr. Will and of Dr. Charlie will survive in the minds and hearts of the thousands who have come even indirectly under their influence.

Before closing this review, a reference should be made to one of the most dramatic chapters in all medical history: that which concerns the work of William Crawford Gorgas. Although not strictly a surgeon, Gorgas may be claimed as one of our colleagues, since the Government deemed him worthy of the title of Surgeon General of the United States Army, the highest honor within its power to bestow upon a member of the profession. Alabama may well be proud of the fact that in him she gave to humanity one of its greatest benefactors. Who dares attempt to estimate the service which he rendered? Who can guess the number of lives which he was instrumental in saving by ridding the world of a pestilence which had plagued its peoples since time immemorial? The South is profoundly conscious of an obligation to him for dispelling forever the fear of a repetition of those scourges of yellow fever which swept its cities during the past century and came so near leaving them desolate. It is a particular pleasure, therefore, on this occasion, here in his native state, to reaffirm the homage of the profession, of the Government, and of all mankind to William Crawford Gorgas, who has no peer among those "whose skill hath served the human lot to raise."

## TOMORROW

... all experience is an arch wherethro'  
Gleams that untravell'd world, whose margin fades  
Forever and forever when I move.

What gleams ahead in that untraveled world, the future of our calling? A fondness for prophecy is a natural human weakness and, judging by medical literature, a weakness to which members of the profession are particularly susceptible. Fortunately, almost all of the predictions of the past have proved false, the difficulty having been an apparent inability of the prophets to see beyond the ends of their noses. To the majority, scientific progress ended with their death. Most of us believe the prophets of Biblical days were supernaturally endowed, but the secret of their power was the faculty for projecting their vision into uncountable years; thus, their prophecies have stood the test of time. And so it is today. The truth of any prophecy will depend largely upon the extent of the prophet's vision. He who would object to being a laughing-stock for posterity must look beyond the limits of his lifetime and project his imagination, tempered by his reasoning, into the more distant future. For the surgeon of today this is a fairly simple matter. Richard Douglass once said that a dwarf can see farther than a giant if he stands on the giant's shoulders. Judging by the advances which have taken place during the past one hundred years, it is not too much to hazard that the future holds in store still other changes equally as radical. The prospect is an alluring one; the temptation to visualize these changes too great to be resisted.

One of the most astounding things about McDowell's operation on Jane Crawford was the fact that he did not see her again for five days after its completion. In that day, the surgeon came, he saw, he operated, and generally that was the end of the matter so far as he was concerned. He destroyed the lesion and, if the patient survived the ordeal, the operation was a success. The surgeon of today is seeking, not merely to remove the lesion, but to cure the patient by removal of the cause. Incidentally, surgeons have been a long time in putting this doctrine into effect; John Hunter preached it over a century and a half ago. The surgeon of the immediate future will continue in this direction. He will delve farther into the laws governing our science, that he may gain a better understanding of the constituents and functions of the various elements and organs of the body, their interrelationship in health and disease, and may apply these laws more effectively in the treatment of the individual patient.

Such a program calls for the concerted efforts of the surgeon, internist, physiologist, bacteriologist, biochemist, anesthetist, neu-

rologist, psychiatrist, and all the other specialists. It entails a vast amount of experimental research in the ancillary sciences. It calls for more exact history taking, more careful and more thorough physical examinations, keener observations on the part of physicians and surgeons. It also necessitates a broad grasp of medicine as a whole; a realization that "a change of function in one part is reflected in changes of functions in other parts and in the whole." In addition, it requires a thoughtful study of each patient from the humanistic viewpoint, to evaluate better all those factors, psychic as well as physical, which have combined to work the havoc for which the patient presents himself. In this day of specialism, the arts of medicine and surgery, which were so beautifully exemplified in the old-fashioned doctor, have been almost lost. It is essential to the further progress of our profession that surgeons and medical men alike cultivate the faculty of seeing beneath the surface and penetrating to those roots of disease which so often lie hidden in the depths of consciousness, and that they exercise the healing power of an understanding and sympathetic personality in order to rehabilitate their patients completely. Without such an attitude, medicine is in danger of being mechanized to a degree approaching the extreme pictured by David Cheever in a recent issue of the *Journal of the American Medical Association*:

One of my own nightmares has been a vision of a patient in a university hospital interviewed, measured, weighed and pictured, every nook and cranny 'scoped, every fluid and secretion analyzed, affording a sheaf of reports duly recorded on a punch card, which is fed into the maw of a computing machine whence issues the mechanically accurate diagnosis and treatment, which is handed to the patient by a robot.

It is true that individualism ended when specialism began. The cooperative plan is an inevitable outcome of the divorce of medicine and surgery, and the future will see an ever more widespread conversion to group practice, but only those groups will prosper which adopt as a guiding principle of their members, individually and collectively, a profound regard for their patients as entities of matter and mind and spirit—human beings created in the image of God.

In this connection, it is well to draw attention to that other danger which has arisen within the past few years to threaten the very foundations of our calling: Government control of medicine. In the pages of *THE SOUTHERN SURGEON* almost two years ago Fred Rankin forcefully pointed out the evils of such a state of affairs. It is sufficient for me to say that under such a regime the profession could not hope to follow to fulfilment the enormous opportunities which appear to be at hand. A united opposition to this movement should be presented by all who would protect the honor of medical

practice and save from destruction the ideals upon which it is founded.

So long as disease exists, surgeons and their confreres in other specialties must concern themselves with treatment. In every department of medicine, methods of treatment are changing almost daily, according to our knowledge of the causes underlying disease and our familiarity with the natural processes of repair. We are already aware that surgical principles are inseparably bound up with biologic and biochemical problems. This includes not only the actual operation, but preoperative and postoperative care as well. We know that the operation gives rise to complex chemical changes in the body fluids, to osmotic imbalance, to leukocytic infiltration, to vasomotor disturbances, and to other abnormal conditions, all of which vary in different individuals. It is not too much to hope that ultimately sufficient knowledge of the laws underlying these reactions may be obtained to enable surgeons to devise tests by which the response of the individual to the operation may be gauged in advance, that he may receive appropriate preparation, that the operative ordeal may be borne with the smallest risk, and that he may be spared some of the unpleasant complications which are now occasionally experienced during the postoperative course. The acquisition of such knowledge would carry with it a better understanding of the natural curative processes of the body and would thereby lead to the discovery of more effective measures of preoperative and postoperative care. Similarly, a study of the chemistry of wounded tissues and of scar formation might point the way to a solution of the question of drainage and the prevention of adhesions, two problems which all too frequently still arise.

Surgeons of today may feel, as others before have felt, that anesthesia and asepsis have reached the limits of perfection. But have they? The ideal anesthetic has not yet been discovered; patients still have postoperative shock and occasionally one dies on the operating table. Asepsis is not all that its name implies; patients continue to develop infections; wounds still fail to heal primarily. The search for safer but more potent anesthetic drugs, and even for more comfortable and more effective methods of administration, will be continued until the mortality is reduced to the vanishing point and shock will be a rare incident. Then, when shock is encountered, more effective means for its treatment will be available. Nor is it unreasonable to hope for innovations in asepsis which will make the contamination of operative wounds practically impossible. Several recent additions to aseptic equipment have brought the realization of this hope a step nearer.

One should not presume, moreover, that little can be added for the improvement of operative technic. When better methods are

known for making patients safe for operation, when more satisfactory anesthetics are developed and shock can be prevented, then surgeons will be able to make operations safer for patients by taking time to execute a more meticulous technic than is possible under present conditions.

Gradually, during this era the realm of surgery has come to embrace many diseases which formerly were regarded as wholly within the province of the physician, and, in like manner, diseases which formerly were eradicated by the surgeon's knife are now treated effectually by the internist. In the future, further adjustments may be expected in the conception of the indications for surgical versus medical care.

Many of the afflictions which assail mankind in years to come will arise from environmental influences—that is, unless some of the modern habits of living are changed. Diseases of the cardiovascular and nervous systems, incident to the stress of existence, will claim much of the surgeon's attention. The fact that within the past few years an operation has been devised whereby patients with coronary disease may be given a new lease on life encourages the belief that in the future we may be able to counteract many of the offenses against the heart and blood vessels which now exact such a heavy toll in disability and loss of life.

Nerve resections are already being employed to relieve spasm and ameliorate pain in the various organs and regions controlled by the sympathetic and autonomic nervous systems. It is quite possible that a more thorough knowledge of the anatomy and physiology of these nerves will broaden the indications for surgery in affections resulting from their disturbance.

A great deal of research has been devoted to the anatomy and function of the various glands in health and disease and, as a consequence, the endocrine system is becoming the object of surgical attack for a number of disorders. Thyroidectomy is already a classical procedure. Now, surgeons are removing the pituitary gland and portions of the adrenal glands for the correction of physical changes brought about by overactivity of these structures. Perhaps the time is near when the deepest secrets of this mysterious chain which binds together so many of the live-giving forces of our bodies will be unveiled.

Faulty diet is being proved the source of more and more physical ills. The gastrointestinal tract is the site of most of these disorders, though of course no part of the body escapes the insults of vicious habits of eating. When the people learn to obey the dictates of the dietitians, they may be able, not only to avert the surgeon's knife for



these complaints, but the internist's medicaments as well, for the diseases themselves may be no more.

In this connection, the role of vitamins in disease is assuming an increasing significance. The recent discovery that vitamin B affords a potent weapon against infection leads one to believe that continued investigation may reveal many disturbances to be influenced by a lack of adequate vitamins and may point the way to their cure by the use of supplementary vitamin elements in the diet.

Cancer is one of the major problems of our day. How will it be met in the future? The ultimate objective is, of course, prevention, and the first step toward that objective is the creation in the public mind of a cancer-consciousness, in order that every person with a suspicious growth may realize the necessity for consulting a doctor before the dangerous stage is reached. The second step is the recording of an exact and complete familial and personal history of the patient, that any inherent tendency to the disease may be detected, and that some of the causes directly responsible may be determined. We have not yet discovered all the possible sources of this dread malady. The third step is a more careful study of pathologic specimens, not only that more effective operations may be devised, if possible, but also that more may be learned of the structure and formation of malignant growths. Finally, in the correlation of all these data may be found the weapon by which the public may be fore-armed; then, the treatment itself, whatever its nature, will be preventive—not merely supposedly curative, as it is almost wholly today.

As is well recognized, the ultimate object of all medical science is the prevention of disease. The program is one in which surgeons as well as internists may assist. Education has much to do with the success of any plans for this purpose. Periodic health examinations should be more actively encouraged, and public health laws should be extended. The profession may with justice be congratulated upon the success of its efforts in this direction thus far, since the span of human life has already been prolonged many years through preventive medicine. It would be tragic, however, to be content to rest on the laurels gained. Hart's prediction that by the end of the present century the average individual will live one hundred years is quite within the limits of reason. Scientific investigation will provide additional means to this end. As the search for more effective methods of treatment of the diseases is continued, by the same route their causes may be discovered. This means that all the tangled skeins of the various systems of the body will have to be unraveled, but when this is done, the profession will have within its hands the



key to the prevention of all disease. Then, our successors will have little field for practice other than in traumatic surgery.

Meanwhile, some real and practical problems will claim the undivided attention of surgeons for generations to come. "Heaven is not reached at a single bound." Surgery has made remarkable strides since the days of McDowell and Sims and Crawford Long; yet, from a contemplation of the vistas ahead, there is still far to go. Many diseases remain to be conquered, and in that conquest the Southern surgeons of the future, like those of the past and present, will be found in the forefront of every battle line until the last victory is won and humanity is forever freed from that "relentless train of sickness, tears and wasting pain."

## THE BIRMINGHAM ASSEMBLY

If a man were required to select one word to characterize the Postgraduate Surgical Assembly in Birmingham March 11, 12 and 13, that word would have to be Enthusiasm. Enthusiasm had been displayed by the local Fellows and those friends they had pressed into service beforehand in getting everything ready for the meeting, and they had perfected all the many little details that are necessary to put on a program with snap and smoothness. Enthusiasm was shown by all the Birmingham doctors and their wives in welcoming their hundreds of guests. Enthusiasm was to have been expected from the presiding officer, and it was also evidenced by the speakers, many of whom were of the rising generation. Above all however stood out the enthusiasm of the Fellows who had come long distances for the Assembly. Many of them seem to have formed the habit of taking in these yearly meetings and their enthusiasm is certainly contagious. They not only find what they want on the program, but meeting their confreres from other States and knitting up of old friendships do not constitute the least attraction of these Assemblies. The Congress is still small enough for one to be able to find all his friends and to feel that he is among friends. If the proof of the pudding is in the eating, the proof of this Congress was in the Birmingham meeting.

Dr. R. L. Sanders of Memphis, President of The Southeastern Surgical Congress, called the Assembly to order at 8:30 Monday morning. The Invocation was pronounced by the Reverend Marvin A. Franklin, D. D., of the Highland Methodist Church. Dr. David S. Moore, of Birmingham, General Chairman, extended a gracious welcome.

Every speaker on the program showed up at his appointed time except one. Dr. Irvin Abell filled the breach most acceptably with the presentation of a patient disabled on account of recurring kidney stones. Dr. Thackston, whose plane had been grounded twice, finally arrived by train, and read his paper twenty-four hours late. It is not too common to have all of thirty-nine doctors scheduled to appear show up. It should be noted that the few speakers who were not able to complete their talks in the time allotted were called down. This snappy adherence to the program is one thing that makes these Assemblies successful. As in former years, there was no discussion on the floor, but the speakers were put through the third degree at the Round Table Luncheons. It is unnecessary to comment here on the scientific material presented as most of it will be published in these pages. It is enough to say that the program was up to the high standard of the past and the hearers were all satisfied.

Monday afternoon Dr. J. M. Mason entertained the Guest Speakers and the Fellows at the Birmingham Country Club.

Monday evening Dr. Sanders delivered the Presidential Address, Dr. Mason the C. Jeff Miller Memorial Address and Dr. Boland a beautiful eulogy of the late Dr. Haggard.

Following the scientific sessions Tuesday afternoon, the Fellows of The Southeastern Surgical Congress were convened for the eleventh annual business session. The Chairmen of the State Committees reported on the whole satisfactory progress and growth; in most States sectional meetings had met with a warm response. Dr. Julian L. Rawls of Norfolk was made President-Elect and Dr. Herbert Acuff, of Knoxville, Vice President. Dr. Abell automatically became President at the conclusion of the meeting.

Before adjournment the deaths of six Fellows were announced and the body stood in reverent silence to do them homage. Those who had passed away since the 1939 meeting were as follows:

DR. PERRY BROMBERG  
Nashville  
July 4, 1939

DR. FRANK HENRY HAGAMAN  
Jackson, Miss.  
August 19, 1939

DR. ARTHUR GODFREY FORT  
Atlanta  
September 15, 1939

DR. JAMES DA COSTA HIGHSMITH  
Fayetteville, N. C.  
October 18, 1939

DR. ALBERT GEORGE KERN  
Knoxville  
December 5, 1939

DR. WILLIAM DAVID HAGGARD  
Nashville  
January 28, 1940

Although it was hard to defer attractive invitations to hold the next Assembly in Gulfport, Miss., and other cities, the Congress decided enthusiastically to accept the invitation of the Richmond Academy of Medicine, warmly extended by its President, Dr. J. Powell Williams, to go to "historic Richmond" next March.

Tuesday evening the banquet was held at the Tutwiler, Dr. James R. Garber acting as Toastmaster. When the excellent dinner had been cleared away, a "Special Radio Broadcast" was given. A roving reporter "interviewed" various doctors as they registered or looked at the technical exhibits. All of the "interviews" were funny and some were a propos and tart, but none was too much so. The Hon. Borden Burr delivered an eloquent oration on "The Future of Medicine." This was followed by lighter entertainment.

Mrs. O. P. Board, assisted by Mesdames H. Earle Conwell, Sam G. Stubbins, Robert M. Brannon, A. Huey Green, Gilbert F. Douglas, David S. Moore, Lee F. Turlington and M. Y. Dabney, graciously looked after the entertainment of the visiting ladies.

Dr. H. Earle Conwell is to be congratulated on the excellence of the scientific exhibits his Committee assembled and for the splendid arrangements made for their display. The list follows:

CARCINOMA OF THE LUNG

SURGERY OF THE SYMPATHETICS

*Drs. Michael DeBakey and Alton Ochsner, Tulane University School of Medicine, New Orleans*

RUPTURED INTERVERTEBRAL DISC—A CAUSE OF SCIATIC PAIN

*Dr. Dean H. Echols, Tulane University School of Medicine, New Orleans*

## BONE TUMORS

*Drs. James A. Meadows and Karl F. Kesmodel, Birmingham*

## INJECTION TREATMENT (SCLEROSING THERAPY)

*Dr. Penn Riddle, Baylor University, College of Medicine, Dallas*

## PLASTIC SURGERY

*Drs. Neal Owens and K. W. Vinson, Tulane University School of Medicine, New Orleans*

DIAGRAMMATIC DRAWINGS REPRESENTING (1) MECHANISM OF GENITAL PROLAPSE, (2) THE ANATOMIC ARRANGEMENT OF SUPPORTS OF UTERUS AND PERINEUM, (3) INTRA-ABDOMINAL DYNAMICS, (4) PERINEAL TEARS, (5) INTRAVAGINAL PRESSURE PLUS HEAT IN THE TREATMENT OF MODERATE GENITAL PROLAPSE, RETROVERSION, CYSTOCELE AND RECTOCELE, (6) A SIMPLE METHOD OF APPLYING ELLIOTT TREATMENT FOR PELVIC INFLAMMATORY DISEASE

*Dr. B. T. Beasley, Atlanta*

## EWING'S TUMOR

*Willis C. Campbell Clinic, Memphis*

## ULCERS AND TUMORS OF THE STOMACH AND DUODENUM

*Dr. John Roberts Phillips, Houston*

## APPLICATION OF VITALLIUM CAP IN ARTHROPLASTY OF THE HIP

*Drs. Charles S. Venable and Walter G. Stuck, San Antonio*

## INTRA-ABDOMINAL ACEPHALIC TWIN

*Drs. D. S. Moore, J. A. Meadows and K. F. Kesmodel, Birmingham*

## CYSTOSCOPIC FINDINGS IN CHILDREN WITH PERSISTENT PYURIA

*Dr. Jarratt P. Robertson, Birmingham*

## ORIGINAL STUDIES IN GOITER

*Drs. Willard Bartlett and R. W. Bartlett, Washington University, St. Louis*

## OBSERVATION ON STAPHYLOCOCCI AND STAPHYLOCOCCUS TOXIN

*Drs. R. H. Rigdon, Paul F. Stookey and Louis F. Carpellino, University of Tennessee, Memphis*

## PATHOLOGY OF SURGICAL SHOCK

*Dr. H. A. Davis, University of Tennessee, Memphis*

## VASCULAR INJURIES AND DISEASE

*Drs. J. M. Mason, Lloyd Noland and R. M. Pool, Birmingham*

## PHYSIOLOGIC CHANGES IN EXPERIMENTAL BURNS

*Dr. John L. Keeley, Louisiana State University, New Orleans*

## NEUROSURGICAL CASES

*Dr. Chalmers H. Moore, Birmingham*

## PYELOTOMY FOR CALCULUS

*Dr. John Duff, New York City*

## URINARY CALCULI

*Drs. Geo. S. Graham and L. C. Posey, Birmingham*

Moving pictures have become an indispensable adjunct to surgical meetings. They have not only proved of greatest value in illustrating talks but they are also exhibited independently. It is often most valuable to have the opportunity to see a movie run a second time in order to pick up the fine points in

technic. During the whole of the three days in Birmingham movies were run continuously in another room on the same floor as the assembly hall and they were shown on a definite schedule so that it was possible for the individual to select those that appealed particularly to him. The Congress is most grateful to the surgeons who brought or sent their films. It is also deeply appreciative of the successful efforts of Dr. Conwell and his Committee in having so efficiently exhibited. The list of the moving pictures is as follows:

O'SHAUGHNESSY'S OPERATION (TRANSPLANTATION OF OMENTUM) FOR CORONARY DISEASE

BECK'S OPERATION FOR CORONARY DISEASE

PERICARDIOTOMY FOR ADHESIVE PERICARDITIS

*Dr. Harold Brunn, San Francisco*

THYROIDECTOMY IN TOXIC GOITER

*Dr. Harold L. Foss, Danville, Pa.*

CARCINOMA OF THE BREAST

*Dr. Hugh Trout, Roanoke, Va.*

SCALENIOTOMY FOR CERVICAL RIB

*Dr. Alton Ochsner, New Orleans*

SUBTOTAL THYROIDECTOMY FOR PRIMARY HYPERTHYROIDISM

THYROIDECTOMY FOR DUCT CYST

*Lahey Clinic, Boston*

HERNIA REPAIR WITH AUTO LIVING FASCIA

*Drs. Hanlin Mattson and Earl J. Boehm, Minneapolis*

CARCINOMA OF THE SCALP

*Drs. T. C. Davison and Fred F. Rudder, Atlanta*

CYSTIC TUMOR OF LUNG AND MEDIASTINUM AND CALCAREOUS TUMOR OF LUNG

*Dr. Stuart W. Harrington, Mayo Clinic, Rochester, Minn.*

CORRECTION OF METATARSUS VARUS IN HALLUX VALGUS DEFORMITY

*Dr. Paul Lapidus, New York City*

APPLICATION OF VITALLIUM CAP IN ARTHROPLASTY OF THE HIP

*Dr. Charles S. Venable, San Antonio*

SURGICAL ACCIDENT, EMBOLI, RESULTS, CAUSES AND PREVENTION

*Dr. Warren A. Coleman, Eastman, Ga.*

PARTIAL GASTRECTOMY AND PARTIAL DUODENECTOMY, POSTERIOR POLYA

BILROTH-I RESECTION OF THE STOMACH

*Dr. Waltman Waters, Mayo Clinic, Rochester, Minn.*

SURGICAL TREATMENT OF HYPERTONIC PYLORIC STENOSIS—FREDET-RAMMSTEDT OPERATION

*Dr. Guy Van Alstyne, Chicago*

VAGINAL HYSTERECTOMY—SUTURE METHOD

*Dr. Louis E. Phaneuf, Boston*

TRANSPLANTATION OF THE URETERS CYSTECTOMY

*Dr. William E. Lower, Cleveland*

## SINGLE STAGE LOBECTOMY

## PNEUMONECTOMY PRIMARY CARCINOMA OF LUNG

*Dr. Richard H. Overholt, Boston*

## PLASTIC SURGERY

*Dr. Neal Owens, New Orleans*

## PLASTIC SURGERY

*Dr. Milton Adams, Memphis*

## LAPAROTRACHELOTOMY TRANSVERSE

*Dr. John C. Irwin, Los Angeles*

## HERNIOTOMY

*Dr. Mims Gage, New Orleans*

## PYELOTOMY FOR CALCULUS

*Dr. John Duff, New York*

## ONE STAGE COMBINED ABDOMINOPERINEAL RESECTION FOR CARCINOMA OF RECTUM

*Dr. Fred Rankin, Lexington, Ky.*

## PLACENTAL BLOOD FOR TRANSFUSION

*Dr. Frank E. Barton, Boston*

## MODERN TREATMENT OF VARICOSE VEINS

*Drs. Howard Mahorner and Alton Ochsner, New Orleans*

## LUMBAR SYMPATHETIC GANGLIONECTOMY

*Drs. Alton Ochsner and Michael DeBakey, New Orleans*

## LARYNGECTOMY FOR CANCER OF THE LARYNX

*Dr. Edward A. Looper, Baltimore*

## SUPRAVAGINAL HYSTERECTOMY

*Dr. John C. Irwin, Los Angeles*

## AMBULANT LIGATION OF THE GREAT SAPHENOUS VEIN

*Dr. Penn Riddle, Dallas*

## PENTOTHAL SODIUM AND OXYGEN ANESTHESIA

*Dr. C. N. Carraway, Birmingham*

## GASTRIC RESECTION

*Dr. John Roberts Phillips, Houston*

## PENTOTHAL SODIUM ANESTHESIA

*Dr. C. N. Carraway, Birmingham*

## MODERN TREATMENT OF VARICOSE VEINS

*Drs. Alton Ochsner and Howard R. Mahorner, Tulane University School of Medicine, New Orleans*

We cannot close this account of the Birmingham meeting without again thanking those houses that provided such interesting technical exhibits that it was sometimes difficult to get the doctors back into the assembly hall. The cooperating firms were

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NOTE: The Editors regret that Book Reviews were crowded out of this issue.

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